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ABSTRACT

This document contains the following papers on graduate and inservice telecommunications from the SITE (Society for Information Technology & Teacher Education) 2001 Conference: (1) "Teaching Technology with Technology" (Michelle Adelman and Susan Luftschein); (2) "Standards of Practice: Online Educator Inservice Workshop" (Cathy and Terry Cavanaugh); (3) "Mission Possible: Project-Based Learning Preparing Graduate Students for Technology" (Harrison Hao Yang); (4) "Managing On-Line Courses around the World" (Nancy Mines and Barbara McKenzie); (5) "Virtual Facilitation: Developing and Managing Relationships in Virtual Teams" (David J. Pauleen); and (6) "The Education Technology Revolution Challenge" (Timothy Tyndall). Most papers contain references. (AA)

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TELECOMMUNICATIONS: GRADUATE & INSERICE

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Telecommunications, according to Webster's Collegiate Dictionary, is "the science and technology of transmitting information, as words, sounds, or images, over great distances, in the form of electromagnetic signals, as by telegraph, telephone, radio, or television." The field has expanded, with the varying technologies that have emerged, and with the types of uses to which those technologies are being put. Education has seen a rapid growth in the use of telecommunications at all levels, for both administrative and instructional uses. Teacher education is in a unique position – using the technology to teach current and future teachers, and preparing them to effectively use it in *their* classrooms. So what technologies are now being used, and what do they contribute to the fields of teaching and learning? Which technologies are promoting appropriate and effective integration of information technologies into teacher education? Who is using these, what are they doing, and what are the results? How do we find the answers to these and other questions that will undoubtedly arise as we both follow examples and develop new approaches?

This year's papers in this, the Graduate and Inservice Telecommunications section, reveal an emphasis on the online world – on courses, activities, resources, and a variety of other issues. The 30+ papers reflect the activities (often collaborative) of 65+ individuals who share their knowledge, experiences, successes, and lessons learned. They provide us with thought-provoking ideas that address the questions above, and suggest paths and ideas that we might take and adapt for implementation in our own programs. Numerous themes overlap, occurring in multiple papers, with the papers themselves often containing a number of these different themes in any given paper. The following arrangement provides a stroll through the garden of Telecommunications in Graduate and Inservice Teacher Education.

Many students are now arriving in teacher education programs with increasingly sophisticated computer skills. There has been much discussion about the need to move from teaching basic technology skills to teaching how to integrated technologies into the classroom. Participation in online classes may require students to do more than learn *about* the technology – they learn *with* it, as they are immersed in it. Van der Kuyl, Kirkwood, Grant, and Parton describe a training course for teachers, in which information and communication technology (ICT) skills are learned and practiced in meaningful contexts as and when required in a metacognitively rich learning environment. Teachers are involved in identifying and planning for their own needs. The course is offered in a variety of formats — totally online, in a traditional class (with some required online activities), or as a combination of both. A key to success is the combination of teaching and learning and the active involvement with the technology, rather than just the delivery method alone.

The use of multiple delivery methods is also described by Davis, Li, and Nilakanta, who employ a hybrid delivery method (with both face-to face and online sessions) and a constructivist approach as students examine and develop case studies about distance learning. The authors suggest two dilemmas that exist for instructors: a balance between breadth and depth as it relates to content, and the need for structure as well as the freedom from it. It is interesting to note that these concerns are not strictly related to distance learning – they are issues related to teaching and learning, and not specific to the technology.

Several other papers also describe programs or projects that are grounded in constructivism. Sujo de Montes and Blocher describe a program based on constructivist principles. They discuss the importance of interactions throughout their online Educational Technology Master's degree program, and explain how they incorporate virtual reality, using the program *Active Worlds*, to promote this interaction. Michelle Adelman describes a program where high school teachers taking *Foundations of Educational Technology Theory* applied constructtivist theory to project-based curriculum, while learning to create web pages, and then combined these two elements as they used them to conduct online research in their content areas and

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then to construct Virtual Field Trips. Constructivism is addressed more directly in an online professional development program described by Monaghan and Slotta. The Web-Based Integrated Science Environment (WISE) includes a web-based curriculum, a virtual community, and virtual mentoring, and participants explore constructivist pedagogy, best practices, and specific curriculum development techniques that they can take back to their classrooms.

Richards and Bhattacharya discuss issues related to converting reluctant Internet users into 'keen' users of the same. They suggest that their conversion model of learning with technology is based on constructivism, but goes beyond it in two ways. It emphasizes the important role of the teacher, and the authors suggest that this might make some teachers less fearful of learning the technology, when they realize that they will not be replaced by the technology.

Obermeyer and Gibson describe the Virtual Professional Development School Consortium's shift from a NetCourse model to a NetSeminar model. They discuss problems with and lessons learned from the former, and the advantages of the latter (including the creation of constructivist, problem-solving, and collaborative learning environments), and their belief that there is an even more responsive system that will surface in the future.

Assessment is a major issue throughout education, and the area of distance learning is no different. Roblyer and Ekhaml discuss the importance of interaction in distance courses, the use of rubrics, the importance of interactive qualities in distance learning, and specific interactive qualities in distance learning courses. They go on to explain how they developed their rubric, and include a copy of their Rubric for Assessing Interactive Qualities of Distance Learning Courses.

Research studies are being conducted in an attempt to determine what is and is not effective in the distance learning environment. Molinari reports on a qualitative study of two online groups of nursing students, and describes findings in task, relationship process, and online communication categories. Student responses may provide online instructors with food for thought as they design and modify their courses.

Another area of assessment relates to student reaction to (or evaluation of) courses. Harmes and Barron conducted a study, over six semesters, of students' reactions to tools and techniques used in a distance learning class. Only one of the 79 respondents would not like to take another course via the web, and 99% reported a positive feeling about web courses. Only 13% felt isolated or alone, while 87% felt the level of group participation was at least the same as in a regular course.

Student reactions are also discussed by Joyce, Nodder and Young, who describe postgraduate computer education courses that met face-to-face four weekends, spaced throughout the semester, supplemented by online activities between meetings. For two semesters, from one course, discussion board postings were collected and analyzed, and at the end of each class, students were asked to rate the usefulness of the different course components. During the first semester, when there were more postings, students indicated that they valued classroom interaction more, whereas during the second semester, with fewer postings, students rated the Internet activities above other resources.

Harrison Hao Yang also reports on student responses, with a concentration on the course content. Meeting in a computer-enhanced classroom, students participated in project-based learning, as they studied "Multimedia and Internet for Education." The four major design principles on which the course was built are described, and findings from student final written reports are presented. Students' reflections revealed major positive effects related to the usefulness of extended learning, effectiveness of production, and proficiency of technology integration, and students indicated that they would take what they learned, share it, and continue to use and learn.

Project-based learning is also the subject of Tyndall's paper describing the Camp Internet Distance Learning Consortium. Camp Internet is a project-based teacher technology training and content delivery program that combines live teacher training with immediate online classroom applications. After a 4-day intensive training session, participants have monthly continuing education sessions, and on-line education and support continues to provide assistance with 4th –12th grade classes. The Camp Internet project trains the teachers, and also provides online classroom materials for the entire year.

With the rapid growth in the offering of online courses, it is essential that online resources be available for use by online (and other) students. Many of the previously described papers include information about resources that result from the described courses and programs. Several papers, though, deal primarily with the production or provision of online resources in various content areas. Peter Serdiukov discusses the structure and organization of ESL websites, with an emphasis on the DEEEP (Distance Education ESL Endorsement Program) website. The website is designed for "teachers who need continuous, updated, effective pedagogical resources for their productive classroom activities and professional growth." Heaton and Sternhagen express concern about problems that keep teachers from fully utilizing the World Wide Web resources for their content areas. Using ARC (the Algebra Resource Center) as an example, they explore three primary functions of content portals on the web. Portals should include filtering, providing content, and building community Each of these will facilitate the finding and retrieval of web resources, but the final one also has the potential of reducing the isolation of the classroom, as teachers join together in communities, working and studying together. Materials are also prepared and disseminated as part of a project shared by Klemm. A College of Veterinary Medicine, a Center for Rural Public Health, and a College of Education are collaborating to develop science curriculum and training for rural middle-school teachers in the field of environmental health information. Klemm describes some of the existing and future modules, explains the related teacher training that is available, and provides information for accessing the web sites.

Marcelo, Mingorance, and Estebaranz continue the professional development theme. They discuss the importance of professional development in teacher education, and the concept of networks as professional development. These concepts are illustrated by a description of the Andalucian Network of Trainers program. Key components are the use of asynchronous communication and group web pages. Zhang and Sextro also discuss an approach to professional development. They describe the HOST (Holden Online Staff Training) Model, the goal of which is to move teachers forward in technology implementation in the classroom. One key component is a web site with web-based video-training clips available for all.

Another example of professional development for teachers in conjunction with the creation of online resources is described by Cathy and Terrence Cavanaugh, who explain how university faculty worked with Florida Professional Development Schools teachers to develop an online workshop to address identified needs. The online format was convenient for teachers, and helped teachers become more comfortable and confident, as they worked with the technologies at their own pace. Key to the success was the involvement of university faculty, but faculty involvement with technology is not the case at all institutions. Joel Levine addresses this issue of faculty and technology. He discusses various models that have been developed in the areas of acceptance, adoption, and use of new innovations. He then suggests support strategies that may assist faculty as they move through the various stages in the adoption of distance education technologies.

As online classes, programs, and/or activities are planned, it is essential to

The importance of community is also discussed by other authors in this section. Bennett and Ekhaml state that the development of supportive learning communities is essential in distance education classes. They suggest specific elements that contribute to the development of such communities, advocating the use of case studies and problem-based learning. Laferrière, Breuleux, and Montané discuss their research that takes place within emerging practices, where they are asking "What happens when classrooms get networked?" and "What knowledge is to be transferred in order to prepare 21st century citizens?" In the process, communities of practice shift to communities of inquiry, leading to a community of interpretation and the development of 12 design principles for creating activities for networked classrooms.

In order to build community in an online class (or among any online group), it is essential that frequent effective communication occur. Abramson and eight doctoral students (Bibeau, Birrell, Cohen, Lundy, Norton, Scalese, Star, and Toral) describe the students' experiences in the process of preparation, posting, and mentoring online, and provide individual reflections that share best practices. Instructors may identify with many of the observations and other comments presented, and may find some innovative ideas to adopt. A recurring theme throughout this paper is that of collaboration, and communication is a key to that. Vizcaino, Favela, and Prieto also discuss these topics jointly. As they address the issue of group collaboration, they examine one approach to overcome the problem of "inefficient conversations," which they feel interferes with the collaborative atmosphere. They suggest the presence of a virtual student moderator to overcome student complaints about off-task discussions, and to foster learning. It is interesting to compare the two different – the real and the virtual.

Types of communication have also been addressed in papers about mentoring and virtual teams. Which type of communication is most effective? Pauleen describes how different virtual teams preferred different types of communication. One group facilitator considered the telephone essential at the group formation stage, while others considered only a combination of Internet-based synchronous and asynchronous modes. ICQ instant chat was determined to be quite effective for some groups. Shafer, reflecting on experiences mentoring beginning teacher researchers, concluded that using both synchronous and asynchronous interactions might be more effective than using just e-mail. She also suggests that limiting communication to one medium may be too limiting, and suggests further study in the area. Communication of various modes is referred to by Carlson and Repman, as they discuss some guidelines, techniques, and cautions related to offering virtual internships. The reminder to check professional accreditation and licensure requirements carefully in especially important as people are looking for creative ways to supervise student teaching.

A recurrent theme throughout this section has been the need for teachers to have training and access, so they will know what to do and how to do it, and they will also have the resources that are needed for successful implementation. Iverson and Baxter acknowledge that learning the *perfect* software program will not help, if the teacher has no access to that technology in the classroom. They have created a Virtual Learning Community (VLC), a set of free, low-cost, or readily available tools to support teachers and students in traditional classrooms, and they provide related faculty development. URLs of web sites with examples and the tools are also provided in the paper.

Implied throughout has been the concept of appropriate integration of the technology into meaningful instructional settings. Many of the papers have discussed specific projects that illustrate this concept. Gersch uses another approach, as she describes ways to use the Internet in the classroom. Her discussion is filed with URLs providing access to ideas she shares, and she then concludes with a list of suggested design criteria for Internet projects. This paper might provide guidance for instructors wishing to introduce Internet applications into their teacher education classes.

So what are some guidelines that might be considered by people wishing to begin developing online courses. Throughout the papers, there have been comments about what has worked and what people would do differently. We will conclude with a paper that provides a framework for developing online courses, and then two papers that provide lessons learned, so that other people will know what to avoid and to do differently. Leggett, Dirksen, and Anderson present a systematic approach to developing online courses. They present a framework of questions in seven domains to guide instructors who are developing such courses. After teaching an online directed readings course in science education, Kevin Barry has described both the pleasure and the pitfalls he experienced, and then he provides helpful lessons learned, so assist others in the design of their classes. Mims and McKenzie present lessons learned of a traveling type, as they discuss factors to be considered when teaching online course in different countries. Based personal experiences, problems encountered and tips for success are shared.

This stroll through these papers reveals that, in teacher education, telecommunications is far more than "the science and technology of transmitting information … over great distances …." as was quoted at the start. It also includes the planning, design, implementation, and evaluation of teaching (and./or training) courses and programs and of resources – all designed to improve the education of our students at all levels. Teaching, after all, is teaching, and the delivery mechanism is just a tool to help us achieve our goals. Telecommunications provides a way for us to reach people who are not able to attend classes (due to time, distance, or other factors), and the papers in this section will help provide guidance as we plan for success.

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Practicing the Skills of Online Communication

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Abstract: Too much of what is considered conversation is little more than taking turns speaking. When this process is translated to a print medium, such as an electronic forum or bulletin board, it quickly ecomes evident that keeping on track is very difficult. The current literature extols the virtues of collaborative learning and the Internet that makes possible collaborative learning across the miles. However, learning is much more than discussion and a good discussion is rare indeed. As part of a graduate course in online

learning environments, distant students took turns mentoring and participating in online conversations that adhered to specific guidelines.

This institutional session will be of great interest to everyone involved in online learning. Graduate students, most of whom are actively employed in distance learning initiatives will share lessons learned and skills mastered in the art of online communication in a learning environment. Each presenter will begin by describing the process of preparation, posting, mentoring and end by reflecting with an emphasis on sharing best practices

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Introduction

Too much of what is considered conversation is little more than taking turns speaking. When this process is translated to a print medium, such as an electronic forum or bulletin board, it quickly becomes evident that keeping on track is very difficult. The current literature extols the virtues of collaborative learning and the Internet that makes possible collaborative learning across the miles. However, learning is much more than discussion and a good discussion is rare indeed.

The Assignment

In the process of refining a methodology for post-baccalaureate distance learning, it soon became obvious that before one could facilitate a cognitively rich online course, one would need to practice the skills of online communication. Forty students met on campus for a week in July 2000 and then returned to all parts of the globe. A customized Allaire forum system readily available on the World Wide Web (WWW), with password access for students, was the tool used for skills development. The assignment required each student, or students in groups of two or three, to mentor a discussion related in some way to online learning.

These online mini-conference threads or conversations were required to be sufficiently motivational to attract at least three participants. They were to be announced in advance for recruitment and could run anywhere from one week to three weekends and the two interim weeks. The assignment recommended that the mentors not assign homework so that focus could remain on discourse and not subject mastery. Instructions were distributed and discussed in class for methods of conducting an on-line conference thread. At the end of the conversation, the mentor(s) had to post a conference summary and copy it to a class thread called Conference Summaries.

Three weeks following the end of the conversation, each student was required to submit a reflections paper written in the first person. The paper was to include where expectations were met, where the mentor disappointed himself, where others disappointed the mentor, and lessons learned about online conversation.

The Outcomes

This first iteration of the assignment has been gratifyingly successful. The makeup of our doctoral classes is very unpredictable since our major entrance requirement is a B+ average in an accredited masters program. As educators, we have learned that a strong top of the class pulls everyone else up. In this case, the top of the class was terrific. Among the students were online community college and four-year college instructors, people in charge of instructional technology for colleges, school districts and even state departments of education, and K-12 technology trainers. Members of the class jumped into the assignment with an enthusiasm always hoped for and seldom seen.

Members of this panel have self-selected to discuss the processes of moderating and participating in online discussions. Although all the participants are doctoral students, the conversations were, for the most part, not cognitively demanding. The best practices learned will apply to a wide range of adult, Internet-based, distance learning environments. Below are reflective remarks about the process prepared by each of the panelists.

Synchronous and Asynchronous Learning Environments

Shelley Bibeau

Three doctoral students who had just met at a week-long summer institute got together in a rather hurried way and decided to share an online conference forum. Crystal Daughtery, Cynthia Townsend, and I, Shelley Bibeau began our collaboration with a very brief discussion of a topic. After institute it seemed a simple thing to plan; after all, we had e-mail and were somewhat computer savvy. So we returned to our home states secure in the knowledge that this assignment would be straight forward, or would it be? For some time I had considered online delivery modes. I was wondering what new experiences teachers were having, specifically with the Internet. It was becoming obvious that synchronous delivery, although useful, was difficult due to schedules, time zones, and the vagaries of imperfect technology. Asynchronous methods seemed to be growing both in use and availability, but development often required time and a learning curve. Soon our group made a first e-mail contact. I jotted down some questions around the topic and asked for comments and other suggestions. When my cohorts responded that the topic was fine I honestly felt disappointed. I thought this was an opportunity to share ideas; instead I felt like the dominant student in a face-to-face classroom who had cowed the other classmates. I resolved to avoid that in the future; after all, this was an opportunity to learn about learning environments while in one, and we did have a good topic, or did we? We decided a one third stint with each of us as co-moderators would be more workable for our busy schedules. We planned to stay in close communication during the forum time period. While we succeeded at that, communication was not always the result. E-mail can be misinterpreted by the reader; more so when you are doing an assignment. I found that my e-mails were sometimes misinterpreted and I misinterpreted others as well. These encounters could be both frustrating and humorous.

The Forum Conference

Our topic was synchronous and asynchronous learning environments. We set out to answer four questions. They were:

1. Briefly describe your experiences with synchronous and asynchronous learning environments.
2. What tools are you aware of/have used before? Briefly comment on their usefulness
3. What underlying pedagogies/andragogies can be found in synchronous/asynchronous learning environments?
4. Do you think there is or should be a difference between synchronous/asynchronous learning environments as used in fully online courses or as supplemental to a traditional classroom? Describe how.

After the call for conference went out and a good-sized group signed up, Cynthia started off the discussion. Her strong communication skills got the participants responding well to question one. She was able to get the group to find common ground by relaying their personal and professional experiences and she sparked lively communication by offering some relevant URLs for the group's reflection on questions two and three. Excerpted articles generated more discussion of how pedagogy should drive the choices of instructional technology, and the baton was passed on to the next co-moderator.

Crystal followed up with an appeal to efforts that would provide a body of research for educators concerning effective techniques and pedagogies for synchronous and asynchronous online activities. Crystal offered some best practices literature and definitions. These helped continue to answer questions three and four. Crystal's leg of the forum occurred at a time when students were struggling with assignment deadlines. She felt her technique was ineffective and would not be consoled otherwise. In retrospect a phone call may have been more helpful than an e-mail - the latter mode does not seem to have the impact as do a few kind words.

I conducted the last third of the forum. The participants now had an opportunity to try some hands-on use of synchronous technologies by visiting a Web-based learning environment, TappedIn, which afforded a free place to "chat." When educators experience various technologies first hand I believe their sophistication increases and will be better armed to work online effectively. In these sessions we continued with our conference questions and examined synchronous learning modes as we compared them to our experience at the moment. Due to the anonymous nature of the sessions people also expressed frustration and anxiety over assignments. Thus, it was difficult for the inexperienced to keep up with several conversation threads, but at the end of each session a log was sent to each participant for their examination and reflection. In general the participants seemed to understand the forum topic and what was expected of them, and they did an excellent job.

After the Forum Conference - Personal Reflection, Personal Foibles

When the forum was over it was time to wrap things up, thank the participants, write a summary and do a few post mortems. Our summary posting was hampered by a few miscommunications, but when it was finally done we breathed a sigh of relief over what was a challenging process. In retrospect I think the forum went a bit too long - nine days would have been enough. I also feel the topic was too broad. If I had to do it again I would have tried to focus the topic specifically on one mode (e.g. synchronous online real-time conversation) rather than be spread so thin.

A couple of my reflections revolve around some of my own personal foibles. I need to have more patience. When activities are performed electronically there is always a wait time and this is hard for me. Another foible is that I still think about comments made in forum that I disagree with, especially some of the "hot button" issues of pedagogy driving technology vs. technology driving pedagogy. I need to find the courage to speak up more, yet, at the same time not be reluctant to argue with people on issues about which I sense there is an emotional investment. To be honest I'm still not quite sure how to do it but the desire is there. Balancing patience with participation is one of my goals.

Working with two co-mentors was both challenging and enjoyable. Frankly I don't know how I would have gotten it all done without our collaboration and mutual support. I was very satisfied with the job my forum group did. We shared personal experiences, some review of the literature, and a hands-on experiential portion that worked well. In retrospect it may have been better to change the order of those three parts but I'm not quite sure in what way.

There were a few disappointments. We could have had better communication during the forum. With our busy lives this was difficult, however. As I stated before I disappointed myself with my impatience. I have a hectic schedule and in order to get things done in a reasonable amount of time I like to start early. I truly believed that this intimidated my co-mentors. That was not my intention, and to their credit they were much too gracious to tell me. My over all satisfaction with my co-mentors was high, however. They taught me some new ways of interacting with people online. Here are some of the major lessons learned about online discussion groups:
Early preparation is a good idea - the conference took more time and attention than any of us had anticipated.
Read and participate in the other forums - they are wealth of free how-tos!
Communication between co-mentors may require phone calls.
Keep the topic focus narrow.
Choose an appropriate time for a forum.
When people post to the forum give them feedback as soon as possible.

The Best Thing – Variety

If I had to select what I thought was most effective about our forum conference it would be its variety. Looking back I like the three-way approach to the topic -- reflection on previous experience, literature review, and hands-on experience. It permits a variety of interaction styles. Some participants were very active in the chat environment, yet they did not post. Since I did not ask them why they didn't post I can only assume they felt more comfortable in a casual more anonymous setting where their input was neither public nor permanent. My co-mentors, whose personal styles brought different people into the conversation was another exhibition of variety. Each of us had a slightly different array of contributors, posting at a different pace (some more than others). The variety was effective. The mix made for an effective forum conference. As for conference forums in the future we still need to address the issues of students/participants dominating topics, others holding back, participation, and sharing knowledge and ideas.

Virtual Field Trips

Susan Birrell

Overview of the Process

We are the experts when it comes to our own learning! Participating by being a moderator in this first online forum experience was an invaluable learning experience and opportunity. During the end of September I was part of a triad that moderated a discussion about virtual field trips. The three of us decided to become a team in July because we all worked in K-12 education in the capacity of technology and learning. Very few other students in the class were from this environment. All of us were interested in exploring online learning for students in kindergarten - high school. Many of us had participated in some kind of collaborative project, i.e. Classroom Connect or Scholastic Network, or another curriculum project in the past. However, all three moderators were new to Nova and in particular moderating. We corresponded online about our respective interests, timelines and responsibilities. We came to consensus easily about the rules, dates, and topics for the weekly topic discussion. It was interesting to note that all three of us, upon reflection, had different definitions for "effective virtual field trips" and because of that became learners and open us to new and innovative definitions. I learned a great deal from this experience. First of all by enrolling participants from a wide variety of backgrounds and occupations in this forum we acquired a wide diversity of perspectives. The definition and categorization of a virtual field trip became very dependent on the life experiences, ages, and professions of the participants. I had never really experienced web cams and videoconferencing in the K-12 environment and these new technologies opened my mind to the possibilities. I must admit that when the discussion turned to critiquing the field trips as boring I did take it personally. Tramline's collection of virtual field trips left the voyeur with a flat affect but there was still some thought and effort that the creators of the site employed. I felt a little bit devastated and shy and reluctant to express these emotions in a posting. I also felt a little bit angry that somebody would use such a strong word that evoked negative thoughts such as "boring" in a posting. There was no other way to take this remark without becoming defensive. After the anger and shock and discomfort subsided, I was pleased to see that this label did evoke some wonderful discussion and strong feelings by other participants. The forum became more interesting and more vital. People seemed invested in the topic and wanted to write a response that contained a definitive opinion. It was almost a relief to be able to express some emotion in a posting.

A Personal Perspective

As a first semester doctoral student who has never participated in any forum previously, I notice that many of my postings in my classes do not elicit responses. I am very cautious to make sure that I quote learned authorities and although I have much practical experience in my field, I often have to squelch my communication because its ideas are solely my own and not a refereed authority. My postings are very impersonal because I am concentrating very much on finding peer reviewed articles to echo some opinions that I vaguely share. However, these posing that must contain references to peer reviewed articles limit my passion and my own voice and commitment to these causes. This structure tends to inhibit my investment in wanting to communicate often and with passion. I am sure there is an art to this and after semester one, my responses will become less stilted and more genuine.

I am grateful for this written reflection paper as it dignifies and makes important my transformative learning experience in moderating a forum. I think I have reframed my experience to be one that can be learned from. I have already begun to post differently to my other class and I am reinterpreting and reframing my ideas and ideals about forums and facilitation. My sense of empowerment and confidence will grow over time with this method of communication. I believe that it will take some practice and some work. Learning about the ways we learn is something that this process of moderating a conference has provided me. By engaging in the process, we become facilitators of the learning experience. Learning how to participate as a team member and work collaboratively is another outcome that as a participant I have garnered.

Your Transition to Online Teaching

Deborah Elizabeth Cohen

My Goals for the Miniconference Thread

The mini-conference thread I led was on transitioning from classroom to online teaching. I hoped participants would explore their feelings about the changes that they had to undergo as a result of teaching in this new way and that they would share best practices. I also hoped this discussion thread might serve as a forum for students to debrief their experiences in moderating these discussion threads. In my invitational statement in which I solicited participation in the forum, I made the participation guidelines pretty broad: "for those who have made the transition from classroom to online teaching (anyone who's conducted a forum here qualifies) and anyone who would like to learn from them".

The Process of Preparation, Posting and Mentoring

The process of preparing for the conference was long and organic. The topic had been in gestation for over a year, and I had had the opportunity to do some preliminary research and to engage in some discussion with professors. Due to taking this course, I had participated in many mini-conference threads. The perspective I brought to the topic was that of a former classroom teacher and college instructor and someone who had had the opportunity to watch people transition from vocations to the same vocations incorporating the use of the computer. In my most recent stint as an instructional designer adapting college courses for delivery over the web and Internet, part of my mission had been to help professors transition to their first online teaching. I had never taught online myself. The Saturday a week before the discussion thread was to start, I started reaching for pen and paper to record notes on ideas that were bubbling forth.

The next day I woke with a start to realize that the forum would be starting in a week. In order to get the attention of those students who do most of their schoolwork on weekends, it would be wise for me to post the invitational statement that day. With the aid of the notes I had put together the previous day, and relying heavily on the invitational statements from previous message threads, I began to compose mine. The invitational statement summarized the content of the thread – the questions we would be addressing - and the "rules" under which we would be operating. I grappled with whether to state my expectation that participants would contribute three times over a two-week period. Was that too demanding? I also wrestled with whether to include a statement asking for participants to treat each others' postings with empathy. Was that insulting? I decided in favor of including both.

I posted the statement and waited…for two days. It was an uneasy time in which I was beset by many paranoid thoughts about why my fellow classmates weren't responding. I wrote one recruitment email and pondered writing others, began thinking of alternate topics to do, and finally had the presence of mind to share my dilemma with my professor, Dr. Trudy Abramson. She assured me that the topic was fine and shared that students' participation was dwindling since it was the end of the semester. Moderators of other mini-threads were having the same experience. She sent an email to everyone in the class, and by the end of the next day I had twelve registrants. (Only seven of the registrants would turn out to be active in the sense of participating regularly.) Every prospective registrant submitted a posting indicating interest. My next challenge was to welcome everyone without being too repetitive. I wanted to convey basically the same message – you're welcome, glad to have you – but not in identical words. I didn't get out the thesaurus, but I did spend time and attention wordsmithing my responses.

A day before the thread was to start, I posted the first communiqué, welcoming everyone to the forum and laying out a schedule and an agenda for how the next two weeks would unfold. I began our discussion thread by asking participants to answer the following questions: "How has this transition caused my role to change? How has my relationship with my students changed?" Participants sent in postings, some in response to housekeeping matters, but mostly related to the topic. I checked the forum regularly and responded to each posting in 24 hours or less, trying to zero in on the substance of what the participant had posted. When someone made a point that I thought was suitable for group discussion I highlighted it and asked for responses. I requested clarification when it seemed called for. Often I didn't receive it. Also– probably to allay my anxieties about feeling isolated – I requested that participants provide me feedback if I did anything as moderator that bothered them. It resulted in one beneficial posting: a request that I provide a heading for the postings of each "round" of the threaded discussion.

This was an example of just one of the ways I benefited from having experienced online instructors participating in my discussion thread. They provided tips that I was able to immediately employ, such as sending out emails to individuals to let them know when an old thread was being put to rest and another was about to begin. That's what I did for the next round. I also posted the next set of questions on the forum: "Are there competencies upon which I formerly relied that I've had to give up? Which new competencies have I had to develop? Has there been a change in the way I feel about myself as a result of these changes?" This round generated the liveliest discussion of the threaded discussion, though probably an equal number of postings as the first round. While I checked the forum several times daily, I did not answer every posting as participants were doing a lot of dialoging with each other. I tried to summarize and/or respond to main points.

Time for the next round came around, and I sent out an email saying a new thread was beginning and the old one was finishing up. I also announced logistics for a synchronous chat session to which three participants had committed to participate. This was to take place towards the end of our time together: on the Thursday preceding the Saturday on which the conference thread was to end. In the discussion thread I posted Round 3 questions: "Have my day-to-day activities changed? Have I felt adequately supported by my institution in making these changes? What is adequate institutional support?" As an introduction, I also posted something about the differences between how I would normally teach a class and how I was moderating this discussion. Results for this third round were disappointing. Only one participant submitted anything – a link to an applicable report that she had written. I read her report, which I found very worthwhile, responded to her in the thread and informed the group that we could discuss her report at our chat session. There were no other responses.

Four of us showed up for the half-hour chat session. I had emailed two of the participants the day before to provide a heads up that I would be asking them in the chat session to clarify some statements that they had made earlier in the discussion thread. The majority of the chat session revolved around these issues, and it made for an interesting discussion.

Earlier on the day of the chat session (Thursday), the fourth round had begun. I had not sent out an email publicizing the new thread and announcing last call for the old. In the discussion thread, I asked participants to share any as-yet-unshared tips for teaching online. I also asked several questions from a portion of a report I had asked participants to read in preparation for our discussion, but told people they could answer the questions even if they had not read the report. The questions had to do with (1) the mechanisms that are available online to help with teacher attentiveness to students and (2) how concern that students become educated can be translated to online teaching activities. A single student submitted three postings summarizing the effectiveness of distance education, providing information on effective feedback techniques and improving interaction, and providing best practices for the design phase. I responded to all three postings with one posting, but no one else did. I ended the mini-conference thread by summarizing the fourth round, posting a thank you to the participants, and placing a summary of the entire proceedings in the discussion thread.

Reflections

Was this discussion mini-thread successful? In my estimation, it was mixed. Yes, in that it met its original goals of providing for an exchange of worthwhile information about the practice of online teaching. Yes, in that it provided the opportunity for an inexperienced online moderator to moderate for the first time and to begin to acquire a little bit of skill. Was it enjoyable? I can now identify with the instructors who report a difficult transition to online teaching. I have to disclose that at least some of the time I found leading the mini-thread anxiety producing, and as a socially motivated person, teaching in a classroom is more personally enjoyable to me. What caused the most anxiety, I think, was the sense of loss of personal control: not knowing which of my actions improved the discussion thread and which developments were the results of forces outside of myself. I am left with some certainties regarding best practices. It is helpful to send email notifications when new topics start and old ones end. Personal email in general seems to be a plus. It is important to craft questions so they are clear and focussed. Tracking the discussion carefully and being responsive are priorities. A simultaneous chat session for participants to clarify issues is of benefit. But I am left with many questions. Why were the first two rounds – particularly the second - so successful, and why did people virtually drop out of the last two? Was I somehow responsible? Was it the combined demands of the end of the semester? Should this two-week mini-thread only have been one? Ideally, the next time I moderate a discussion thread I would like to simultaneously employ usability testing to better evaluate the causes of what occurs.

Use of Simulations as Online Instructional Strategy

Jo Lynne Lundy

Asynchronous Online Communication

Communication is the most important activity that we perform as humans; it is the heart of everything that we do. For communication to take place, there must be a sender, a receiver, and a message. If the message is intended as instruction, there must also be an environment in which this educational communication occurs. Asynchronous online communication promotes a type of interaction that is often lacking in the traditional classroom. It allows learners the freedom to explore alternative pathways, develop their own styles of learning, and opportunities to research and reflect on the discussion taking place. Thisreport summarizes my experience of participating in and moderating an online asynchronous discussion thread. Participation in the online class discussions involved reviewing the topics and choosing a topic of educational interest, yet one in which an intellectual contribution could be made. Some of the thread titles proved misleading. Other threads had rigid rules, and participation in these was exhausting and more of an exercise in survival. However, many threads were interesting and relevant, and I benefited from both lurking and participation.

Co-moderating a Discussion

I moderated a thread eight weeks into the term, so I had time to learn from others what was successful and not so successful. The initial plan was to moderate the thread alone, but as I outlined the topic and schedule for the two week thread, a classmate expressed interest in the same topic. Over a four-day period, we decided to co-moderate the thread, obtained permission from the instructor to do so, outlined our duties and responsibilities, and posted our opening comments and questions. Planning for the two-week discussion was difficult in such a short time frame, but we were both relieved to not have to face the moderating assignment alone. During the next two weeks, we realized that flexibility, adaptability, good communication, and voicing expectations were the keys to our successful discussion. Keeping our group to a maximum of eight participants allowed us to handle the discussion well; some threads had 12-15 members, and the discussions seemed difficult to manage.

Moderating the thread was more difficult and time consuming than I imagined, but the goals outlined for the discussion were accomplished. I tried to respond to participants within 12-24 hours, and at times was overwhelmed by the pressure to keep the discussion on track, along with acquiring some needed HTML skills. I was challenged by the participants and learned much from the references and links that were posted. Believing that the role of moderator should be one of a facilitator, guide, director, monitor, and peer, I attempted to keep the discussion informal, yet informative.

Reflections on this experience include: feeling more confident about using electronic communication, learning from others what was successful and what invited failure, learning to write in a public forum and for an interactive purpose, learning to analyze and respond to the writing of others, and learning to express an intellectual position on a topic. Learning occurs as a result of both planned and unplanned activities. The asynchronous communication assignment provided a rich learning experience, and should be considered an important instructional strategy for distance education.

Tests??!! We Don't Need Online Tests!! Or Do We?

Mava Norton

Forum Overview

Moderating an online discussion for the first time is a learning process. A classmate and I co-moderated a forum where the goal was to gather input from practicing distance students and distance educators regarding the *appropriateness, effectiveness and challenges of online testing*. The conference began with participants reading an article to start them thinking about testing and assessments in the online environment. As participants began the discussion they were asked to define the range (level and subject) where they were teaching and/or working. The discussion began with the following questions:

1. In an online course, why type of assessments are appropriate?
2. Does testing even make sense? And if so,
3. Should online courses have tests proctored – either on campus or where the student resides?
4. What assessments do you think most reflect the mastery of course materials?

Other questions addressed during the discussion were:

1. When dealing with online assessments, projects or self-check tests, what are our objectives when developing the assessment?
2. What are the challenges offered with this type (project-based) assessment?

Participants

There were nine people discussing the issue - seven participants and the two co-moderators. There were college professors, corporate trainers, and educational technology staff. Several participants posted daily or very often and others posted over the course of two or three days. The times where several people participated with their different viewpoints and opinions being offered created some lively conversation. I feel we had good discussions and received a great list of references and links from the participants. Even though I thought I had my mind made as to what online testing should be like, I have to admit this forum caused me to rethink some of the issues.

Preparation

Via email, my co-moderator and I discussed the topic, what questions to start with, whom to post the conference beginning and summary and whom to respond to participants. We decided to split the forum moderating time with him responding to daytime postings and me to nighttime but with both of us participating and responding when we login. Up until the last couple of days of the two-week forum, I was unable to connect to the forum site from work because of firewall issues and he preferred daytime because of family issues. This division worked well for both of us so that we knew someone was checking the forum frequently everyday.

Expectations

This is the first forum where I've been the moderator (or co-moderator). The topic, testing in the online environment, is of interest but any topic would have worked since it was just the tool for the learning process. I started without too many expectations. I wanted to explore the moderating process and all the aspects that go along with being an effective moderator. And to have constructive forum where all participants receive something. I feel that this was fulfilled through this forum. It was definitely a learning process and I now have a greater appreciation for forum moderators.

Disappointments

During the two-week session I was so intent in trying to keep the conversation going that I forgot what a forum should be… communication between participants. My job was to check things like links and other reference contributions and encourage conversation. Not dominate it. I don't think I was too dominating but I did tend to "push" the conversation without letting it evolve naturally at it's own pace. Several participants were slow in contributing. As the moderator, this was frustrating; however, looking at it from the other side, I know that I've not always been the most faithful contributor in forums for many reasons. I'm sure that they had valid reasons as well. I hope that if these were not class projects and were just informational forums that more interest would be applied in contributing since the participants would choose to register.

Lessons Learned

I learned many things from this process. First and foremost, *forum moderating is very time-consuming*. Even if others have not made a contribution, just the process of trying to stay on top of everything requires logging in several times a day. Checking links and references and providing corrected information requires time and effort. I always felt like I had to comment or ask a question to make sure the conversation did not lag. In doing this, sometimes I was too quick and didn't stop and think. When I moderate a forum again, I will be more careful to read and assimilate the information before responding. Letting some "silence" be around is not bad and can encourage others to contribute. I learned that *I would not like to moderate by myself* unless I was able to do it as my main job function and not in addition to a full-time job, as a full-time student and full-time mom. My classmate and I worked extremely well together in this co-moderating process. Having someone to discuss all the aspects of the forum process was extremely beneficial. Knowing he was there to contribute or keep things going and on track helped keep the pressure from being too overwhelming

A great lesson learned here and from participating in other forums is that *forums are great places for obtaining current up-to-date information*. Participants provide great links and references. I'm not sure if others have more time or are just better researchers; however, I've obtained some excellent references and information to use in research papers. I intend to find conferences to participate in, as I get closer to the dissertation process. I know they will provide valuable information that can be utilized in my research and writing. And maybe I can help someone else in what they need as well. I learned that *having active participants is a moderator's dream*. I hope I can be a better participant because of this process and seeing the issue from the moderator's point-of-view. And finally, what I've learned is that *moderating and participating in these forums is a great learning tool*. I definitely have more appreciation for the whole process now that I've seen it from both sides of the coin (so to speak). Knowing what I do today, I would definitely recommend moderating and participating in forums.

Communication within Postsecondary OLE's: Students' Expectations vs. Professors' Ability to Deliver

Ellen Scalese

I co-mentored an asynchronous online forum. Having mentored discussion threads, during the process of instructing in an online masters program, I was secure in my ability to mentor an online forum. I had already had three years of experience, which had helped me to learn the difference between posting answers and questions and communicating. I knew the difficulties inherent in trying to maintain the proper balance of intellectual freedom and keeping the forum to the topic simultaneously. As a first term doctoral student, I was not as confident of my ability to formulate a topic that would elicit peer participation. I decided that co-mentoring with a more experienced student might be the best method of approach. I met Paula Harvey, a third term student, who was taking the same Institute Courses. We spoke often during various breaks, developed a rapport, and decided to co-mentor a discussion thread.

The Co-Mentored Approach

Before defining our tasks and dividing up duties, Paula and I had to decide on our topic. We listed topics of interest to each of us and then discussed them jointly. Paula wanted to use a topic of particular interest to a variety of students. The topic was student-professor communication as an issue in perceived success or lack of success in an Online Learning Environment. That was a topic I also found interesting. However, as an experienced online professor, I wanted to include not only the students' expectations, but also the demand on the professors' time. Many professors in OLE's, myself included, are faced with larger class sizes and a large number of assignments to be graded, needing to be balanced with students needs for timely feedback. Our topic was formulated and our forum was given a title: Communication within Postsecondary OLE's; Students' Expectations vs. Professors' Ability to Deliver.

By mutual decision, we defined our tasks and divided our responsibilities. Paula would find a referenced background piece that would elicit thought and participation. She would formally state the conference goals and compile thought provoking questions intended to elicit interest and response from: first time distance learners; experienced distance learners; and distance educators. I would be responsible for the daily monitoring of the discussion. Paula would contribute as a participant. I would remain the unbiased mentor until the conclusion. I would respond to participants in a timely fashion. Although not one of her delineated duties, Paula frequently acknowledged participation and provided her personal feedback. I would provide mentor feedback to what was stated and ask additional questions and raise issues to promote response from other participants. I would summarize when needed and attempt to keep the topic on course without squelching intellectual freedom. I would close the forum and provide a summary. Paula and I would communicate by e-mail and telephone throughout our co-mentoring of the thread.

Thread Overview

The goal of this thread was to gather input from practicing postsecondary distance learners and distance educators regarding the degree of communication necessary to retain students, promote collaboration to offset isolation, and to explore communication options, time constraints, and conveyance of professionalism at a distance. Everyone was asked to read a thought-provoking article titled: Response on Demand – Professor Available to Students 24x7. The general topics for discussion included questions to novice distance learners, to experience ones, and to distance educators.

The interaction among the participants resulted in meaningful discussions promoting a further understanding of the amount, formats and timeliness of communication, between professors and their students, perceived by the students to be necessary to their success in OLE's. It is my perception that it also encouraged the participants to realize that professors cannot be available 24 hours a day. While we did not arrive upon a definitive "number" for response time or "amount" of necessary words, we did arrive at a group consensus of opinion on several items.

- Communication is perceived as a key success factor for students in an OLE by both the professor and the student;
- The amount of communication is not as important, as a perceived presence of the instructor in whatever online format is being used;
- The exact amount of response time to questions and assignments is not as important as a covenant being determined at the onset and that covenant being adhered to.
- Communication needs to be established immediately in order establish a sense of community and to foster a comfortable relationship between students and the professor.
- Students are not unaware that the professors have many demands on their time, or that there are many more students than professors. They just want to feel that their professor will respond to their needs in an acceptable fashion.

Reflections

I did not anticipate the difficulty we had in recruiting participants to join our forum. When we originally posted our thread, we had one immediate response for participation, then nothing. We waited a few days while continuing to lurk in other forums trying to judge what was garnering their participation. Paula and I both contacted other students and requested their input as to why we were not gathering a forum. We both received the same response several times. People who were interested were already involved in one forum and could not shoulder more responsibility or the timing was poor; there were several assignments due for the various courses at this time. Paula and I decided to repost once again with a new start date and a slightly changed title, as well as begin an e-mail campaign requesting participation. This garnered us the needed participants.

After a rather difficult beginning, the participants who joined the thread promoted lively discussions, meaningful opinions, facts and ideas. They formed a community and responded to each other in a comfortable yet professional manner. The participants not only shared personal opinions and experiences, they shared a wealth of informative references. They appeared to feel comfortable with both agreement and disagreement. They communicated amongst themselves using meaningful and constructive comments. When they became sidelined they were very responsive to my directing them back to the initial focus of the forum. They participated frequently out of interest rather than an assigned number of times. They obviously spent time and thought on their responses.

The partnership that Paula and I formed was most successful. Through the course of our co-mentoring, we discovered that we have differing skills, approaches and experiences that complement each and helped to form a very successful partnership, that benefited the forum as well as ourselves. Paula is an experienced 3rd term DCTE student from a corporate background. She has a wonderfully expressive style of writing and skill with words. She has a way of writing that draws the reader in. She did a wonderful job presenting our initial topic. As a participant, she incorporated humor that promoted community. Whenever the forum was lagging, she "popped in" to revive things. I, as an experienced distance educator, was already aware of the inordinate amount of time and effort it takes to mentor a thread. I was successful at providing timely acknowledgement of all contributions. I would spend several hours a day reading participants postings and carefully wording responses that were neutral and yet would elicit further response. I am experienced in the fine balance that must be maintained in order to promote freedom of thought in students and stay on task simultaneously. At the midway point, I summarized the consensus we had arrived at to date. I reiterated questions as yet unanswered and requested each participant respond to a few of the untouched issues. I waited until the end of the final week to express my opinion as a distance professor, so as not to distract from the students' viewpoints.

Having mentored graduate discussion groups in the past, I was already aware of several lessons learned by my partner. I was aware that there would be various qualities of responses among the participants and that careful guidance is necessary to keep a discussion group alive. I learned how much easier it is to mentor with a partner, each having their own roles to play. When I mentor threads alone, they do not usually form such an immediate sense of community and comfort. This is due to my more formalized approach. I will attempt a slightly more relaxed approach in the future. One of the main lessons I learned is that the more ownership or community the students feel in a forum, the more thoughtful and professional their responses become. Pride prevails and they are more willing to invest the "extra time" needed to raise the quality of the forum.

Are you a Survivor?

Lisa Star

This discussion thread was created to explore the characteristics required to teach in an online learning environment. We thought this would be an appropriate topic since many of the students in the class have extensive experience with online learning and in contrast others have little to no experience. Using this discussion forum to research the topic and then present results provided a collaborative effort for both learning and evaluating. My partner had no experience in online learning environments and I had considerable experience. We used our relationship as model and it proved a good balance.

Process of Preparation, Posting and Mentoring

The timing of our discussion coincided with the sensationalism of the "Survivors" television show, so we agreed to blend that popular theme into our research project. We wanted the participants to search for what characteristics were needed to "survive" teaching online. Our goal was to solicit a dozen participants. We fell short of that, but were glad in the end that we had fewer than expected participants because of the time element of group dynamics and needs.

The participants were divided into two groups and assigned tasks. We wanted to achieve both independent participation and group work. We were also looking to see if certain people would step forward and take a leadership role - no one did. Participants were expected to do research and submit the characteristics they thought were necessary to teach in an online learning environment. We requested that their responses be supported by references that followed the stated format. After each participants submitted a list of characteristics the two groups each posted them and voted. The top five from each group were joined to form a list of ten comprehensive references. Then the entire conference voted on the top five. We did see some overlap in the characteristics and allowed people to vote for the most articulate responses.

My partner and I met for the first time in class and just seem to connect, so we agreed to work together with no topic in mind. We spent several weeks exploring online journals and articles searching for a topic. We even spent a few sessions on the phone. We established a great working relationship that far exceeded my expectations. Group work can often become frustrating. We divided responsibilities and took turns monitoring the threads. It worked out great. This characteristic is a key dynamic of the process, in that two strangers team mentored the thread creating a wonderful collaborative relationship. Our institutions were physically located hundreds of miles apart, and I spent the majority of the two weeks on vacation in California, with a laptop of course.

People signed up and started participating right away. We found they went faster then we expected at times. I have found this in my own classes, that some students seek out the next step and if you have it posted they will act on it before you are ready. This did not prove to be a problem, and groups both completed all tasks.

What did prove interesting was the dynamics of the two groups. My group had a very diverse set of responses and tended to avoid literary support. Beth's group on the other hand provided detailed references to most all responses. The participants seemed to follow the "leader" and mimic the first postings. I believe that I follow this model as well. I often read the examples posted by others students and respond in accordance to their style. We only had one person not fully participate or follow our required dates. We received many outside emails from the group participants and we tried to respond to group members in email as much as possible. Everyone who joined the conference completed it. We did post a summary of all the tasks and participants, which included a check off sheet to show what they had completed. I think that this thread helped clarify the tasks. Being able to visualize the process often helps in an online environment.

Reflecting on best practices

I must admit that I was surprised by the responses that were finally chosen to represent the top five characteristics. I found they differed from my perceptions. I also found that there were large discrepancies in the voting. I was surprised that some of the characteristics did not make the final vote. I believe that we meet our desired goal of engaging a group of students to establish a dialogue on this topic. Even if the "list" was not truly academic, the discussion was lively and informative. I did learn that conferences take a considerable amount of time. I think that my partner and I underestimated the amount of commitment this project would take. This may have stemmed from the fact that we participated and moderated. We were impressed that the discussion went along at a steady pace and the number of hits to the conference exceeded 100.

Final Five Characteristics Required to Teach Online

The instructor must be:

- Knowledgeable about subject matter
- Able to communicate effectively
- Warm and Friendly / Human
- A Motivator
- Able to foster a comfortable learning environment

Collaboration and Interactivity in Online Learning Environments

Pilar Toral

Preparation

The "Seminar in Online Learning Environments" course at Nova Southeastern University required the mentoring of an asynchronous threaded discussion on a topic related to online learning environments (OLEs). During the required week-long visit to Nova for the Summer Institute, another student and I decided that we would to work together on this task, and agreed that we would divide the forum mentoring; she would moderate the first week and I would moderate the second week. Although my co-mentor and I come from different parts of the world and very different cultures (Israel and Puerto Rico), we were both first term students at Nova and biology professors. This common ground helped us establish a comradeship that began that week at Nova.

After returning to our work and families, we continued to communicate through e-mail, trying to decide what issues we would cover in our online discussion. It took us some time to agree on a topic as severalof the subjects that we considered had already been discussed in other forums. We continued searching for possible topics and after a great deal of shared brain storming, we decided on "Collaboration and Interactivity in Online Learning Environments". After researching the literature and discussing the subject, we decided that she would mentor the discussion on *interactivity* during the first week of the forum and I would mentor the discussion on *collaboration* during the second week. When time came, we *collaborated* by writing the forum goals, the introduction, and the conference summary together. Each of us wrote our part of the discussion We then read and corrected each other's part before posting them in the forum. Our goals for the forum were to discuss the importance of collaboration and interactivity in the success of online learning environments. We also decided on suggesting examples for collaboration and interactivity, reviewing the pertinent literature, and exploring various collaboration and interactivity tools and free software available. These goals, the forum's beginning and end dates, the rules for signing up for participation, and an invitation for peer participation were posted six days before the forum's start date. The discussion was limited to ten participants. We asked them to contribute to the thread at least three times during the two weeks. Although references were not required, postings that included references or active URL's to appropriate Internet sites were welcomed since they would benefit everyone.

The Discussion

Our threaded discussion began on September 17, 2000 and ended on October 1 with five registered participants and one non-registered participant (lurker). My co-mentor began the conference by describing the topics to be discussed and initiated the discussion by asking for the meaning and importance of interactivity in online learning environments. Different definitions for interactivity in online learning environments from the literature, other examples, and shared experiences were discussed. Participants also mentioned the three important types of interaction: learner – content, learner – instructor, and learner – learner interaction. I continued with the discussion in the second week and started with a reference to an article that presented collaborative online activities such as online debate, online peer evaluation, online case study, online guest speaker, and online bulletin board activities. Various free collaboration tools available through the Internet, in addition to two commercial products, were also brought up for group discussion.

The forum had a slow beginning; we received the first contribution after a friendly reminder was posted three days after the forum started. My colleague and I were worried that the small number of participants could make the discussion slow or cause it to have poor interaction. Two other forums were running simultaneously with ours but fortunately, after the slow beginning, we had a good level of participation from our five contributors during the rest of the forum's existence. Participants could post their replies to any of the previous postings and they would receive our feedback within 24 hours. The mentor who was not moderating at the time, would contribute to the online conversation in order to keep the dialogue active and on the right path. In general, the participants stayed on track, although occasionally they did not respond to the questions or situations that we presented to them. During the discussion we occasionally had to rephrase or change the questions since they were not as well received as we had counted on and did not elicit any responses. Overall, the participants would usually comment on what they already knew or had experienced, sharing their knowledge, opinions, and any references they had on the topic. This is one of the advantages of peer online conversations - sharing one's experiences and expertise with others and at the same time acquiring and evaluating new sources of information. This "knowledge exchange" can contribute to expanding one's knowledge in a more natural and effortless way.

Reflections

Our threaded discussion achieved the goals we aimed for. Most importantly, I learned the basic skills that are required to have good online conversations and that good communication and collaboration are needed when a forum is co-mentored. I learned that trying to keep an online conversation active and interesting for the participants can consume a lot of time and effort and that it requires good knowledge/research on the topic at hand. The topic of this co-mentored forum is collaboration and interactivity; the best example of collaboration in an online learning environment is precisely the co-mentoring of the forum. I truly enjoyed the opportunity of sharing this unique experience with one of my peers. The fact that I was able to work hand-in-hand with a colleague and not alone also helped to relieve some of the pressure and responsibility of mentoring a high-level discussion forum for the first time. I have benefited greatly from reading and participating in online discussions. They have helped me to refine my skills on how to communicate effectively in online environments and to obtain and share information and references on a variety of topics. The discussions also made it easier to maintain direct contact and communication with my peers and professors throughout the term.

Teaching Technology with Technology

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Abstract: This paper reports on the experience of a two-person team instructing urban high school teachers to use computer technology. The course is presented entirely on-line in an asynchronous environment. It is the first course in a series of four in a Teaching and Learning with Technology certificate program.

Course I, Educational Technology Theory, presents and actively involves student in discussions of cognitive science and learning theories and their practical applications. At the same time, students receive instruction on constructing a web site. As the course progresses, the students build an instructional resource web site that they will be able to use in their classes.

This presentation will describe the process used in the on-line environment, demonstrate student projects, and relate student's plans to implement technology in their own classrooms.

I hear and I forget
I see and I remember
I do and I understand
(Ancient Chinese Proverb)

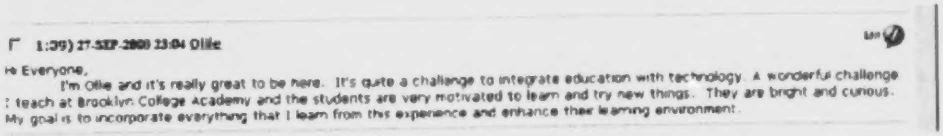
The pilot program offered by the New School University in the fall of 2000 explored the significance of this proverb and the implications it has for teaching in a 21st century urban classroom. Well situated in the heart of Greenwich Village, New York City, the program was nevertheless delivered asynchronously via the web. Participants were all teaching in New York City alternative high schools or middle schools. Although most of the schools implemented a project-based curriculum with portfolio assessment the teachers were responsible for ensuring that their students would meet new standards on state achievement tests.

The first course in the sequence was *Foundations of Educational Technology Theory*. Participants examined philosophical and pedagogical underpinnings of the current educational system and began to explore cognitive science principles that facilitate meaningful learning. They reevaluated the work of John Dewey, one of the founders of the New School. They applied constructivist theory to project-based curriculum while focusing on the new state standards.

At the same time they engaged in a parallel activity, learning basic html coding and Macromedia Dreamweaver™, the web-site authoring program. In addition to learning new skills, they engaged in active learning. We believed that they would master the technology and apply it in a meaningful way if they used it in their own learning process.

The New School University provided an opportune environment for this experiment since it has a solid history of offering robust distance learning courses. Dial, a proprietary instructional interface, provided the discussion-based environment. Participants were able to respond to instructors' questions or assignments, upload responses, and email individuals privately. An orientation period preceded the regular class session so participants would not be overwhelmed by the technology. On-line and telephone support was available 24/7. Our program thus began with a solid technical foundation.

Participants came to the program with a variety of skills. Some were quite proficient with computers. Others were hesitant, to say the least. We wanted to find out how to engage each one on his or her level and help them develop the technical skill set. As you can see in Figure 1, they started by uploading a message introducing themselves.



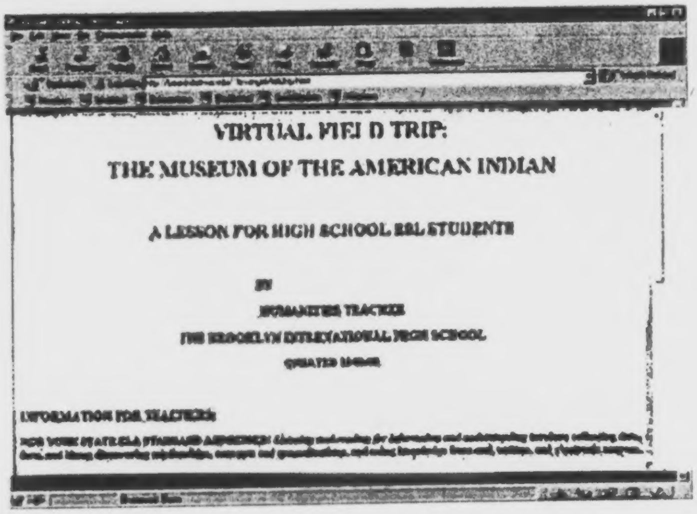
1:39) 27-SEP-2000 23:04 Ollie

Hi Everyone,

I'm Ollie and it's really great to be here. It's quite a challenge to integrate education with technology. A wonderful challenge. I teach at Brooklyn College Academy and the students are very motivated to learn and try new things. They are bright and curious. My goal is to incorporate everything that I learn from this experience and enhance their learning environment.

Figure 1: sample on-line dialogue, student introduction

They then conducted on-line research in their subject matter areas and constructed a Virtual Field Trip lesson as seen in Figure 2.



VIRTUAL FIELD TRIP:

THE MUSEUM OF THE AMERICAN INDIAN

A LESSON FOR HIGH SCHOOL ESL STUDENTS

BY

HUMANITIES TEACHER

THE BROOKLYN INTERNATIONAL HIGH SCHOOL

UPDATED [illegible]

INFORMATION FOR TEACHERS:

NEW YORK STATE ELA STANDARD ADDRESSED: [illegible]

Figure 2: web-based lesson, Virtual Field Trip

The asynchronous environment enabled participants to fit the course into already crowded work and family schedules. The discussion based environment facilitated group interaction, resulting in sharing and helping each other, in short, creating a community of learners.

At this point we have only anecdotal observations. More extensive studies will be conducted in the spring. We are especially interested in identifying factors that facilitate conversation and participation.

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Pitfalls and Pleasures in a Distance Based Directed Readings in Science Education Course

Abstract

What works when facilitating a distance education directed readings in science education with graduate students that are also teaching full time? The author will share experiences from teaching in the University of Notre Dame's Alliance for Catholic Education (ACE) masters in education program. This directed readings course includes 25 students that are teaching at Catholic schools in under served areas throughout the south. The course is conducted during the fall and spring semesters using WebCT's bulletin board system and an electronic mailing list.

Introduction

In the midst of my second time teaching the Alliance for Catholic Education's (ACE) directed readings in science education course I have had an opportunity to experience a number of successes and failures in a distance education environment. Fortunately the failures have provided lessons that have, based on the anecdotal evidence improved the experience for the students taking the course.

ACE students are in a Master of Education program at the University of Notre Dame. Admission to the program is selective with about 1/3 of the students applying being admitted. There are approximately 75 students in each class cohort and 150 total students in the program. The program is based on the pillars of Academics, Community and Spirituality. Students in the program have there tuition covered and are paid a $1,000 per month stipend. In return they teach for two years in Catholic schools in underserved communities in the southern and western United States.

The program begins with an intensive 8 week summer session during which first year students complete basic education courses and have supervised teaching experiences in local schools. The students then report to their assigned schools where they are full time first year teachers. The commonly have 3, and many up to 5, preps as they begin there first year teaching. In addition to their first year teaching duties these students participate in 2 to 3 three credit, distance based courses that extend across the entire academic year. Second year teachers have completed another intensive 8 week summer session and take an additional 2 to three internet courses during their second year teaching. In addition to traditional assessments of students work they submit a portfolio documenting their teaching experience at the end of the second year of teaching.

The directed readings in science education course consists of a mixture of first and second year students that are teaching at a variety of levels, 4th through 12th grade, and a variety of courses, basic science through AP physics.

Pitfalls

Technical Difficulties

The first time that I taught this course was the first year that the courses were offered in this format. There were many delays in getting equipment setup and some technical difficulties after it was in place. These problems made progress in the course very difficult.

Other Obligations

The students in this class, like those in most distance education environments, have many other pressures that demand their time and unless the class is made a priority it can very easily slip.

Motivation

Students in this class seemed to want direct practical applications for what we were discussing than in my experience with face to face classes. I believe this is a result of their being immersed in real teaching situations and having problems that they need to solve immediately.

Pleasures

Technology

For my second time around teaching this course the technology was, for the most part, in place and functioning. As a result I had a very early assignment that verified everyone's ability to participate. I found that even in cases where a house computer wasn't working the students good get access using a computer at their school or public library. As a result of the infrastructure being ready is that we got off to a good start.

Participation as a Priority

Though the students have an equal number of obligations as before they are better able to keep this one in mind as the course progresses. This seems to be from a combination of the early start reserving a place for the course in the routines of the students and a much more structured grading system in which the students cannot turn in late assignments. In the current class over 80% of the assignments have been submitted even thought the structure lets the students opt out of several assignments without a negative impact on their grade.

Motivation

This time around I have taken a completely different approach to my role as a motivator. Before every assignment is due I send a note reminding everyone. Then as the first few submissions arrive I acknowledge them publicly and comment positively on the work that is being done and how important it is to the success of the class. The students seem to respond well to these efforts which, with the measures mentioned above, have resulted in excellent reviews of literature and discussion of those reviews by the students. These are strategies that I have never had a need to use in traditional classroom based settings and were, at first, a bit awkward for me. I have now become accustomed to cheerleading and feel comfortable that by performing that role I am providing a valuable service to the students.

Developing Communities of Learning in Distance Education Courses

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Abstract: As the popularity of distance education courses increases, so does the pressure to design robust distance courses that support maximum student achievement. One criticism of distance education courses has been that the medium encourages minimal student engagement and passive participation. Incorporating a community of learning approach into the design of distance courses requires students to be actively involved with course content, fellow students, and the teacher. This paper describes strategies that contribute to the development of learning communities in distance education courses.

Introduction

Distance learning courses, whether online or mediated, offer many benefits to instructors and students -- particularly in terms of when and where they can engage in course activities. Many students enroll in distance education courses because of the convenience. However, once enrolled, student participation in these courses varies widely. Some students sign on faithfully and contribute regularly to the online or mediated course activities and discussion. Others "lurk" or participate passively, choosing to limit their interaction to reading posted materials or listening to course proceedings with only an occasional comment. A few students don't participate at all (Kearsley, 2000).

Though it has been recognized that students may derive some benefit from simply listening or reading materials online, students who actively contribute to a group learning experience maximize learning and achievement. Unfortunately, active participation is a goal that may be difficult or impossible to elicit from students in a traditional distance education course. Students may be uncomfortable using the technology, or may not feel the need to engage in conversation with classmates or the instructor since they are geographically removed. However, incorporating a community of learning framework into distance education course design provides strategies to stimulate students to actively engage and participate in collaborative learning.

Communities of learning involve all students as full participants (Vaughn, Bos, and Schrumm, 1997) in a collective effort of understanding (Bielaczyc & Collins, 1999). Learning communities are committed to the concepts that students learn by directing their own learning, working with people, dealing with complex issues, collectively sharing knowledge, and showing respect and appreciation for all (Bielaczyc & Collins, 1999). Applying these principles in distance environments is similar to employing them in face to face classrooms. It means providing students with individual choices to make course work personally meaningful as well as engaging them in collaborative group work to support collective growth. Case studies and simulations offer students the opportunity to deal with authentic, complex issues. Encouraging students to develop and share expertise in individual areas of interest broadens class scope and develops appreciation for individual strengths and differences. Without a supportive learning community, distance education students can easily become isolated, lose interest and motivation, and may eventually drop out. In a nurturing

community of learners, distance students help each other learn, become involved, and contribute their unique experiences and resources.
This paper describes course elements that contribute to the development of learning communities in distance education courses. The major strategies include making sure students and instructors become acquainted with each other early in the course; sharing responsibility for collecting and contributing course-related information and experiences; encouraging and scaffolding mediated interaction; and providing active, authentic learning activities. These techniques have been used successfully in distance education courses to help students become active participants and contributors in both online and closed-circuit video courses.

A number of activities can be employed to help course participants get acquainted. Having an initial face to face meeting provides an opportunity for students to interact directly. Traditional face to face ice breakers such as having students interview and introduce each other can get things started, but posting class member biographies (derived from the face to face interview) and photos is a good follow-up to reinforce connections and awareness. An online practice quiz that highlights interesting information about course members helps participants get to know each other as well as familiarizing students with the quiz utility. In addition, students can be assigned online buddies or assigned to small study groups to begin discussing course issues immediately. The sooner the students become comfortable with each other, and with the communications medium, the stronger the learning community will become.

Students must also accept responsibility for contributing to the class information base. This can be accomplished in a variety of ways. Small groups can research basic terms and concepts, or read different articles and share their findings with the rest of the class via bulletin board postings. The bulletin board also provides a venue for follow-up discussion and clarification of unclear material with students serving as the experts for the information they shared. Individuals and groups can also research and make class presentations on major course issues. Working in groups, even at a distance, reinforces the sense of community as well as expanding the class information base. However, it should be noted that group interaction via distance communication tools can be difficult initially.

Getting students comfortable with mediated public interaction is critical to nurturing the learning community. Most students will be comfortable with private email, but they must also participate in public communications to the entire class. Early activities can be simple listserv and bulletin board conversations where students post personal reflections and experiences about things they are currently doing. As they gain confidence using the communication tools, they can use the chat rooms for structured interchanges and communications. Guest speakers can address the class in chat rooms, and respond to questions from the class. Or, small groups can debate hot topic issues in chat rooms. For chat interactions, communication protocols must be established to take the place of the visual cues that signal when a person is through talking. A common practice is to post the word OVER when a person finishes speaking.

Designing active, authentic learning activities begins with the identification of problems that are relevant and contextualized in real world experiences. Case studies and problem-based learning activities offer students the opportunity to interact via email with real experts about real problems, brainstorm solutions in small groups on the bulletin board, and then share problems and solutions with the whole class using web presentations or videoconferencing. Employing these approaches virtually brings the world into the classroom, and expands the community of learners globally.

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Field Experiences at a Distance: Virtual Internships

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Abstract: Online instructors face the dilemma of providing meaningful field experiences for learners. In the *Social Life of Information,* John Seely Brown and Paul Duguid revisit Jerome Bruner's distinction between "learning about" and "learning to be." Brown and Duguid state (p. 128) "In the age of the web, learning about is easier than ever before." The real challenge for internet-based education is to help students learn how "to be." Field experiences and internships move students away from focusing solely on information toward an understanding of how knowledge informs practice. This paper explores creative ways to facilitate meaningful experiences in the field of practice for students-at-a-distance.

Internships and more extensive field experiences

Advanced or intensive internships are an important part of many professional education programs, and in many cases certification or accreditation agencies require supervised internships. Internships are a challenge in any setting when students hold down full time jobs and have family responsibilities. Since these characteristics are common with non-traditional students enrolled in on-line courses you will have to consider a variety of flexible approaches, including virtual internships (discussed below). You will also have to find ways to observe students while they complete their internship assignments. This may be accomplished using web cams (synchronous observation) or videotape (asynchronous observation). With either method, be sure to obtain proper permissions from everyone involved. Online students should keep extensive field experience notes, which can become reflective journals. Students should e-mail notes and journal entries to you regularly so you can monitor their activities. Site supervisors should also be in regular contact so that you can provide appropriate guidance and feedback. No matter what method you use, read professional accreditation and licensure requirements carefully. In some fields students may have to complete internships following very specific requirements, including specific qualifications for internship supervisors and direct observation. You should not assume that a licensure agency would consider a virtual internship to be equivalent to a traditional internship.

Virtual internships

A quick search of the web reveals numerous examples of virtual internships. Dr. Thomas Barker from Texas Tech University (http://english.ttu.edu/courses/5378/inet/about.htm) suggests that there are mutually beneficial advantages to this form of internship. For the intern, the experience provides:

- Flexibility - Unlike conventional enrollment patterns, virtual internships may span semesters and summers.
- Experience - Virtual interns develop skills at using the latest communication technology applications and paradigms -- email, file upload/download, desktop videoconferencing, white board, real-time audio and video, and chat in both synchronous and asynchronous modes.
- Convenience - Virtual interns can complete the course requirements from any personal computer, in any location that has the appropriate software.

- Supplemental income - Some virtual internships pay up to 1/2 or more of entry-level salaries. The paid internships are very competitive.
- Research - Virtual interns develop research, writing, and problem solving skills that they will be able to apply in later work experiences.

Virtual student teaching

With more and more emphasis being placed on online instruction, especially for students in advanced teacher education programs, you might want to consider providing a virtual student teaching experience. Unlike the internships and field experiences described above, in virtual student teaching, students practice their instructional skills in an online environment, under the guidance of an experienced distance educator. One example of this model can be seen at http://hale.pepperdine.edu/~bsouza/ed630a.htm. In this graduate education course, students collaboratively plan, direct, and assess and online instructional experience. In this case the students teach instructional units to other students enrolled in the same course, but this model could be extended to other types of virtual learning experiences.

Virtual internship administration

Most virtual internship programs include a formal and business-like application process. Control of the process may be with the educational institution or with the employer, depending on the institutional arrangements. Most require a letter of application, a short resume, and a work proposal or statement of interest. If there seems to be a match between the proposed intern's skills and the nature of the available internship, then there may be a negotiation between the employer, educational institution, and the intern over the specifics of the internship. Specifics about the time commitment (full-time or part-time) and length (starting time and total number of hours or product to be produced) need to be agreed on. The expectations for equipment to be furnished by the employer, employee, and the educational institution must be resolved. Another important detail is whether the intern will receive pay and at what level. Commonly, if the interns are paid, they are paid at about half the rate of an entry-level position. The matter of supervision must also be addressed. Most of the time the employer provides the direct supervision. At the end of the internship, the employer then writes a letter of evaluation to the educational institution. Grades are typically assigned from that letter.

Field experiences and internships are critical parts of any learning experience. Online educators will probably have to work harder and be more creative to establish these relationships until technology and our technology comfort level catches up with our goals and objectives. You might start with a small project, such as having students conduct e-mail interviews with professionals or subject matter experts, and then let this initial communication build into a deeper relationship. Or you may set up a full-fledged virtual internship program based on one of the models described above. No matter what approach you take, you will help your students become part of the community of practice.

Web Internship Examples

The Allegiance & Arkansas State University Virtual Internship Program (http://www.astate.edu/docs/acad/coba/VIP/home.htm)
***Central Europe Review*'s Virtual Internship Programme** (http://www.ce-review.org/_internships.html)
The Manhattan Institute of Management (MIM) (http://www.vinternship.com/online_internship.htm)
The Virtual Volunteering Project (http://www.serviceleader.org/vv/)
Mighty Mentors: E-mail Mentoring for Teachers (http://www.mightymedia.com/mentors/)

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Standards of Practice: Online Educator In-service Workshop on Curriculum Standards and Technology Applications #63

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Abstract: "Standards of Practice" is a 10-hour, asynchronous web-based workshop designed for a broad range of educators. The workshop provides an overview of curriculum and technology standards, and integration of effective technology into standards-based teaching. Topics include searching, evaluating web sites, and research on the web. The workshop was developed by university education faculty under a professional development schools grant to meet needs of area schools. "Standards of Practice" was offered to teachers in the professional development schools. After completing the workshop, teachers received a certificate that they submitted for district inservice credit toward certification renewals. The workshop is composed of six modules: Introduction to Technology Standards, Sunshine State Standards, Searching the Web, Evaluating Web Resources, Research using the Web, Best Practices in Integrating Technology into Standards-Based Instruction. Each module includes instruction on the topic, links to web materials, self-paced practice activities, and suggestions for finding further information on the topic.

Teachers in a cluster of Florida Professional Development Schools (PDS) recently identified their needs for continuing education. The main themes that emerged were understanding of curriculum and educational technology standards, improving technology skills, and learning best practices for teaching standards with technology. The state university's college of education working with this group of PDS teachers used grant funds to develop a package of professional development experiences addressing the needs of the teachers. The experiences included university graduate courses, hands-on technology skills and integration workshops in an area instructional technology center, and an online workshop. The menu of options enabled teachers to choose topics, schedules and learning styles that best suited them.

The teachers were familiar with courses and workshops, but most were new to online learning. The attractive features of an asynchronous web-based workshop included flexibility in location and time of learning, and self-paced and independent learning. The intimidating aspects of an online workshop involved the lack of face-to-face interaction and immediate instructor support, and the requirement of basic computer skills and web access. The online workshop format was well-suited to teachers who possessed the prerequisite technology skills and access, those who enjoy independent learning, and those who had limited time to travel or meet in a structured classroom. The online workshop also opened the opportunity for teachers who participated in face-to-face workshops to continue and extend their education independently.

University faculty worked with the PDS teachers to develop the online "Standards of Practice" workshop. The workshop was designed for all educators working at K-12 across content areas. The workshop offers an overview of national and state curriculum standards relating to technology, and educational technology standards, and practice with integrating effective technology into standards-based teaching. An evaluation of the technology components within the state standards across the curriculum areas revealed common themes and skills, which led to the workshop topics. Topics include effective searching, how to evaluate web sites, and how to do research on the web. The workshop was delivered using the online course environment WebCT. The workshop is structured as six modules. The module topics are: Introduction to Technology Standards, Information Literacy and State Standards, Searching the Web, Evaluating Web Resources, Research using the Web, Best Practices in Integrating Technology into Standards-Based Instruction.

Before beginning the workshop modules, users are instructed to print the study guide page, as an advance organizer for workshop activities. Each module includes instructional information, online references, self-paced practice activities, and suggestions for further information on the topic. Upon entering a workshop module, the teacher/learner reads an introduction to the topic and its importance. Next, important concepts are described, and web pages are recommended. Readers are invited to explore recommended web pages. Readers have the freedom to leave and revisit modules at any time. Modules conclude with an interactive activity, such as evaluation of web resources, self-assessment instrument, or practice with skills and knowledge. After completing each module, a five-question limited response quiz is given. Users must achieve a satisfactory score on the quiz before proceeding to the next module. The purpose of the quiz is to document successful participation in the workshop so participants may receive continuing education credit from their school district.

Module Outline:
Module One, Introduction to Technology Standards:
Discussion of the need for educational technology and curriculum standards, review of US Department of Education and International Society for Technology and Education (ISTE) standards for teachers and students, exploration of Milken Foundation Dimensions for Gauging Progress, review of state and American Library Association technology literacy standards, self-assessment instrument where teachers receive a rating on the continuum from Learner to Leader in educational technology, and web sites for further reference on the topic.

Module Two, Sunshine State Standards:
Overview of information literacy, discussion of the state goals for improving education with technology, list by grade and content area of the state curriculum standards relating to technology, a drag-and-drop activity matching information literacy skills and examples of classroom application, and web sites for further reference.

Module Three, Effective Web Searching:
Overview of the value of web searching skills, discussion of the tools for seeking and assessing information on the web and their relationship to the standards, comparison of web searching tools and guidance for choosing appropriate tools, searching strategies and operators, information about critically assessing information located on the web for an education task, a list of web sites for further reference on the topic, and activities in which users compare the results and capabilities of a group of common web search tools.

Module Four, Evaluating Web Sites:
Discussion of the need for web users to critically evaluate web content, questions and criteria to use when evaluating a web page for educational use, a sample web resource evaluation checklist, a list of web sites for further reference on the topic, and a practice web page evaluation activity involving the judgment of sample web pages for specific educational situations.

Module Five, Researching on the Web:
Discussion of the value of using the web for educational research, flowchart of an online research process for students, skills for managing information located online, procedure for citing electronic references, Fair Use guidelines for using electronic information in an education context, a list of web sites for further reference on the topic, a multiple choice activity in selecting the correct citation format for online references.

Module Six, Best Practices in Classroom Computing:
Discussion of classroom structures recommended for effective use of computers for learning, an information literacy approach, teaching and management strategies for classroom technology, findings related to the physical setting for classroom technology, a list of lesson plans and further resources related to the topic, a likert-scale activity for rating the effectiveness of classroom technology scenarios.

"Standards of Practice" was offered free of charge to any teacher in the university's professional development schools, and teachers earned a stipend during the grant period upon completion of the workshop. After completing the workshop, teachers received an automatically generated certificate stating that they satisfactorily competed requirements of the workshop. Teachers submitted the personalized certificates for school district credit toward renewing their teaching certificates.

The workshop met the needs of the target audience by providing them with experience and knowledge within the curriculum standards, skills using the technology as a teacher and learner, and information about best practices for integrating technology into curriculum. The online format was very convenient for teachers who had limitations in attending face-to-face training. This format also allowed the teachers to become more comfortable with the technologies as they worked at their own pace.

Dilemma Analysis of Constructive Case-based Approach to Distance Learning

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Abstract: This study explores the dilemmas faced while teaching a course on distance learning based on constructivist learning principles using case studies. The course is open to undergraduate as well as graduate students. It is a hybrid course. The class meets once a week for two hours and the remaining time interacts online using WebCT, an online course management software. The course design draws on constructivist learning theories of Vygotsky and Lave and Wenger's theory of authentic learning. The students are introduced to concepts of distance learning by studying real-life cases and also developing and analyzing their own cases of distance learning. Such an approach presents dilemmas at every stage of its development, for example, the need to strike a balance between breadth and depth of content to be covered. The authors continue to struggle with similar issues causing them to constantly review and revise their design leading to a fuller, richer learning experience.

Introduction

This is a pilot study exploring the dilemmas faced while teaching a course on distance learning using case studies and based on constructivist learning principles.

The year 2000 is a time of rapid transition and convergence with both communications technologies and distance learning. Indeed, such rapid evolution of education is also challenging traditional distance learning institutions, such as the renowned UK Open University. Such rapid changes have intensified the dilemmas faced by teachers. The topics and content of the course to be taught are changing by the month and multiple views must become visible. Indeed, students need to be assisted to handle this ambiguity and rapid change as they learn the principles and a wide range of practice within a 16-week semester

What is a small course team of one faculty member and two graduate students without start-up funding for instructional designers and technologists to make of this dilemma?

As a response, Dr. Davis developed an approach that is case-based and constructivist in nature with support from graduate assistants, Qian Li, and Rema Nilakanta. The flexibility and "open architecture" of a constructivist approach adapts well to the fast-changing content and technologies. The dilemmas emanating from such an approach are continuously confronted through an action research approach to course development and implementation over time. Action Research has been used in technology and teacher education for some time in the UK (see for example Somekh and Davis, 1997); our approach of development and research is described in Davis & Trend (1999).

Course design

The course, Curriculum and Instruction (CI) 407/507: Principles and Practices of Distance Education (DE), is open to undergraduate as well as graduate students. It informs students of current and old practices, principles, and technologies involved in DE. The recommended texts are provided in the reference section of this paper including the required text, Kearsley (2000). The course design draws on constructivist learning theories of Vygotsky as well as Lave and Wenger's theory of authentic learning. In some ways a constructivist approach to teaching implies that the students are involved in creating their own learning. The teacher's approach is to challenge students to search for relevant information and to integrate it within their existing and developing sills and knowledge.

Cased-based instruction lends itself to a constructivist approach. Case method has been used for some time in professional schools, such as law, business, and medicine. Cases can be used to uncover underlying principles and concepts similar to a well-defined problem in problem-based learning (PBL) where "the given state, goal state, and the allowable operators are specifically clear to the problem-solver" (Mayer & Wittrock, 1996, p. 48). This kind of use implies an established body of knowledge where the student is expected to acquire the knowledge deductively, as in the fields of law and medicine. Cases can also be used to discover or develop new principles when faced with an unfamiliar situation as seen in the field of business education. This is similar to an ill-defined problem in PBL where "the given state, goal state, and the allowable operators are not specifically clear to the problem-solver" (Mayer & Wittrock, 1996, p. 48).

We are attempting, in this course, to combine the two uses of case-based instruction. The students will be introduced to concepts of distance education by studying cases of DE and also develop rich case studies that they can repeatedly return to as they uncover salient principles and practices of DE. They thus engage with the principles, theories, and models of distance education within the context of cases and project-based learning.

The classes are conducted in a hybrid environment. Students meet face-to-face once a week for two hours as well as online with the help of WebCT, an online course management software. The course contains a rich collection of cases from which students draw the distance education design and delivery principles and practice. These cases are drawn from different situations of distance learning, including higher education, K-12 schools, as well as professional development training. In addition, students are expected to develop and study one case of DE of their own choice as well as analyze the course itself, CI407/507. The approach is unique in that while studying and analyzing different cases of flexible learning students are also actively creating their own case of distance learning because much of their interaction is conducted online. Students thus investigate and evaluate the use of WebCT within their own learning.

The cases used in CI407/507 are different from traditional cases in that these cases are presented using multimedia technology. Traditional cases are mainly text-based, but our cases are presented with many hypertext links, images, and audio files; thus presenting a fuller, richer picture to the student. Bronack et al. (1999) provide another but different example of a case-based learning environment.

Dilemmas of a constructivist approach

The above course design propels the student into active learning, which involves learning through exploration. However, implementing this kind of approach is a challenge. It brings up early dilemmas at every stage of its development. Below are some observations based on data collection.

One of the dilemmas we faced during the early stages of course design and which still continues, is the need to strike a balance between breadth and depth as it relates to content. On the one side, we want to introduce students to a variety of applications of distance education and to let them have a taste of different course management software (e.g. WebCT, ClassNet, Blackboard.com, etc). On the other hand, we believe students should be encouraged to acquire deep understanding of distance learning, which implies a focus on fewer applications of distance education and online courseware. In other words, a superficial browse of a wide range of technologies is unlikely to lead to high quality transferable knowledge.

A second ongoing major dilemma we are facing is the need for structure as well as the freedom from it. How much structure do the students need in order to facilitate their learning, but at the same time have the freedom to explore on their own? In other words, how high and deep should the scaffolding reach? These dilemmas appear to become more acute when dealing with undergraduate students.

Future plans

The next stage is to revise this and other courses led by Dr. Davis and the mode of delivery so that they can be studied through distance learning by students in more than one university (ISU and London University Institute of Education). CI 507 will be offered for the first time in Summer 2001 with students on both sides of the Atlantic — in Ames, Iowa and London, UK. Progress will involve expansion of the teaching and action research team as well as evolution of the course design and content. It is also likely to involve more innovative on-line environments and communities of professional development. However, we must not jump ahead too fast. The immediate first step is to complete our first round of development and research on case-based learning at Iowa State University. We also suspect that our development and research is likely to study dilemmas that others face within and beyond the context of the teaching and learning at a distance.

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USING THE INTERNET IN THE CLASSROOM

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This article will focus on how to use the Internet as a tool to enhance classroom teaching. The "Internet Style of Learning" is helping teachers and students change the approaches to teaching and learning. Teachers can easily take one of their traditional lessons and turn it into a web-based lesson using resources from the Internet, or take a topic being taught and create a collaborative inquiry-based project than can be shared with a class in another location, nationally or globally. Once you know where and how to use the Internet to find resources for such lessons and projects, the process is not difficult.

The Internet also allows you to meet hundreds of teachers from around the globe. Why not learn how you, too, can meet them! By going to http://www.epals.com , you can search for educator around the globe and create an opportunity for sharing, collaboration, etc. There are so many ways that teachers around the globe are using the Internet to bring the world into the classroom. Examples of many projects and collaboratives can be found at sites under "Projects" at the web site at http://www.schoollink.org/twin.

Most traditional lesson plans can easily be enhanced by adding Internet activities. These activities can include research exercises, communication with other students or experts, virtual field trips, publishing, collaboration, interactive activities, or Internet searches. It is always good to have students use the search engines that are designed for students (http://www.yahooligans.com) or http://www.ajkids.com (Ask Jeeves for Kids). Teachers can learn a lot from each other when they join listservs. You can find out about listservs by going to http://www.liszt.com. Many teachers have already created lessons that include Internet components, so we should take the time to view such lessons at sites such as http://www.thegateway.org/, http://ali.apple.com/ali/, http://www.sdcoe.k12.ca.us/score/cy912.html, http://edweb.sdsu.edu/webquest/matrix.html.

Some teachers find it better to start with new lessons when creating web-based Internet activities for instruction. They use their traditional lessons as outlines for their new activities. It can take a long time to create the new weblesson. Time has to be spent searching for the right sites for the lesson. Once the sites have been chosen, the next procedure is to develop some meaningful activities for students to complete when they visit the site. If the students are going to communicate with other students/experts, make sure they understand time zones and realize that they won't get responses immediately. Once students are proficient in using the Internet, they can do scavenger hunts on the Internet to find information. Of course, it's a good idea to try out the lesson before teaching with the Internet. Be aware that there might be technology problems so always have a backup lesson. WebQuests are always a good way to get started with Internetized lessons http://edweb.sdsu.edu/webquest/webquest.html. For information about WebQuests you can read *SOME THOUGHTS ABOUT WEBQUESTS* at http://edweb.sdsu.edu/courses/edtec596/about_webquests.html. An excellent tool for teachers to use to create their web-based activities is found at the *Filamentality* web site http://www.kn.pacbell.com/wired/fil/. After reviewing the site, you can easily create Samplers, WebQuests, and Hotlists. To create the assessment rubrics, you can use a tool at http://landmark-project.com/classweb/rubrics/.

Once web-based lessons become the norm for teaching, Internet projects should be the next step. Such projects should include students collaborating with other classes to exchange data, share writing activities, and create discussions on topics of interest. In addition, mailing lists often post requests for participation in hundreds of Internet projects. There are many commercial projects available for those who prefer to "buy in" to a packaged project. Project ideas can be found at http://www.iearn.org, http://www.thinkquest.org, http://www.gsn.org, http://www.eduplace.com/projects/index.html, and http://www.globalearn.org.

What is a project

Projects are collaborative, interactive learning activities that allow students and teachers to interact with each other to carry out a research activity that supports the existing curriculum in new and exciting ways. Students use the Internet's research, communications, and publishing tools to get involved in data exchanges, team writing projects, world explorations, and even global shopping. The classroom walls become invisible as students connect to global partners and experts via the Internet. Through such projects, students around the world work together, sharing the experiences, research, and learning resulting from their work.

Ideas for projects come from students and teachers, and projects vary as widely as the people participating in them. Some projects consist of writing assignments, which are then posted to conferences and eventually gathered into a publication, a Web page, or other multimedia presentation. Others consist of art projects, in which students from different schools exchange works of art. Still others provide ways for students to get directly involved in helping to solve problems in other countries.

Projects are usually organized according to the age/grade levels of the participants and by curricular subject matter. Participation is open to either students of all ages, primary/elementary students, or intermediate/secondary students. Subject areas include environmental or natural sciences; social studies, politics, and economics; arts and literature; language-based; and other/interdisciplinary.

Projects have been classified in a variety of ways. I*EARN (http://www.iearn.org), The Global SchoolHouse (http://www.gsn.org) Judi Harris (http://www.esu3.k12.ne.us/institute/harris/Harris-Activity-Structures.html), and Bernie Dodge (http://edweb.sdsu.edu/webquest/webquest.html) have made outstanding contributions to the use of Internet projects. For example, I*EARN has categorized projects as structured, unstructured, and Learning Circles. Judi Harris has done extensive research in the area of Internet projects. As a result, she has classified projects into the following categories: Online Correspondence and Exchanges, Information Gathering, Problem Solving, and Competitions.

What follows are some suggestions and helpful hints in getting started with Internet projects.

Suggested Design Criteria for Internet Projects

While teachers try to accomplish a variety of activities during their classroom instruction, it is possible to achieve many of the following goals when implementing Internet projects into the regular classroom curriculum.

Internet projects should:

- focus on getting students to use their minds well; raise real questions and allow students to do authentic work rather than exercises from a workbook;
- develop instruction around the questions, ideas, and concerns of students;
- recognize and use learners' purposes for learning; view learning as meaning-making and constructive rather than passive reception and regurgitation of transmitted information;
- develop active approaches to learning and encourage students to express their ideas and opinions;
- give students ownership of their learning;
- view teachers and students as co investigators both should seek knowledge and solutions to problems; foster collaborative/cooperative learning and devise activities that help build a
- sense of community;
- view students as producers of knowledge and publishers of their work;
- provide moments when everyone takes time to reflect on what they have learned;
- contribute to understanding of other nations and cultures;
- strengthen students? literacy and academic skills; and
- provide ample opportunity to strengthen students' technology and Internet skills.

The Internet can make teaching and learning exciting while encouraging students to become lifelong learners, contributing members of society, and valuable members of the world of work. The research, communications, and publishing skills learned by students through Internet activities are essential for now and the future. I have been using the Internet for 12 years. I often ask teachers who aren't using the Internet, "How are you accessing information"? "How are you communicating"? "How are you teaching"?

Assessing Distance Learning Tools and Techniques: A Case Study

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Abstract: Distance learning offers students many advantages over traditional courses. This study examined student reactions (through the use of a student survey) to an entirely web-based course. The course was a graduate-level class titled Telecommunications in Education. Of the 79 responses, all but one responded that they would like to take another course via the web. Ninety-nine percent of the students reported a positive feeling about the ease of use of the web course. Additional items solicited feedback with regard to specific features of the online course.

Introduction

Many studies have compared the effectiveness of learning in a traditional on-campus course with the same course delivered via distance. Of these, several have found that distance learning courses (regardless of instructional medium) are equally, and in some cases more, effective than their face-to-face counterparts (Clarke, 1999). To be effective, these distant courses must include timely feedback from the instructor and opportunities for interaction among the students. In addition, the delivery method must be appropriate for the tasks (Moore & Thompson, 1990; Verduin & Clark, 1991).

Most of the research on distance education has focused on its effectiveness, i.e., comparing student course grades or performance on exams between traditional course delivery and distance-based instruction. Little mention has been given in the literature to students' attitudes and reactions after experiencing distance education. This study was designed to explore student reactions to a course delivered entirely on the World Wide Web. The goal was to gather information that could be used to improve the design and delivery of distance education courses. In particular, the study was designed to investigate students' reactions to tools and techniques used in web-based delivery. Answers were also sought related to student perceptions of community, time commitment, and amount of learning in the web-based environment.

Method

To address these issues, a survey was designed. This instrument contains ten items, each with an individual response scale generally having four or five options. Following these ten items are two open-ended questions designed to solicit more qualitative data about students' overall experience with the distance learning course and advice that they would offer other students who might be considering a distance course. The survey was given to all students in a graduate-level course (EME6936: Telecommunications in Education). This course is delivered completely via the web (using WebCT software). Data were collected over a series of six semesters. There were a total of 79 students in the six-semester period. Individual class sizes ranged from 8 to 15. All surveys were anonymous and voluntary.

Results

An interesting result to note is an overall satisfaction with the distance learning experience from this course. Of the 79 total students, only one responded that they would **not** like to take another course via the web. Ninety-nine percent reported a positive feeling about the ease of use of the online course.

Of the features employed in this web-based course, students reported that the bulletin board was the easiest to use (37%), followed by e-mail (29%), chat (21%), and the quiz (14%) functions. The chat feature was by far the hardest to use (37%) with the bulletin board (25%) and quiz (14%) following.

Students' perceptions of "community" when taking a distance learning course have been a major area of concern in discussions of distance learning. Of the students in this course, 87% reported feeling a level of group participation at least the same as a regular course, if not more. Only 13% reported feeling isolated and alone (one student commented that this was a positive attribute).

The most frustrating portions of the distance learning course were reported to be problems with software (e.g. using AOL's browser), trouble communicating with other students, and long download times (30% each). Trouble communicating with the course instructor was reported to be the least frustrating aspect (1%).

When asked about their perceptions of the amount of time required for the course compared to traditional courses, fifty percent of the students reported spending about the same amount of time and work on the distance course as they would have in a traditional on-campus course. Thirty-six percent reported spending more time and work on the distance course.

With regard to the amount of learning they acquired in the distance learning course compared to traditional courses, the majority of students (64%) felt that they had learned more in the distance course than other college courses. Almost all of the students (96%) felt they had learned the same amount or more in the distance-based course.

Data from the first open-ended question, "What is your overall impression of online learning?" were first categorized as positive, neutral, or negative. There were two negative responses, seven neutral responses, and seventy positive responses. The negative responses mentioned dissatisfaction due to the increased amount of time required to complete course activities and frustration with connecting to the USF server. Neutral responses were general comments about distance learning, such as "I'm not an education major", or "Benefits from the course depend on the student." The most common positive response was "I loved it!" Other positive comments included the benefits of time and distance removal, as well as increased personal attention from the instructor.

Responses to the second question, "What advice would you give future students in online courses" clearly centered on the need to keep up with the coursework and not fall behind. Students also wrote about the benefits of having a "buddy" in the course, i.e., someone to encourage you and help eliminate any feeling of isolation. The third most prevalent response suggested the need to be familiar with using the web, and to have the most powerful computer with the fastest connection to the Internet that you can afford.

Summary

As more and more college courses are being offered via the web, it is important to assess students' perceptions and obtain feedback on effective practices and techniques. The lack of variability in this data (with the majority of students providing positive responses) is very encouraging. Further analysis might involve investigation of response patterns over time, as more students became familiar with the web environment. In addition, researchers may investigate patterns in student interactions as they relate to course satisfaction.

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Mission Possible: Project-Based Learning Preparing Graduate Students for Technology

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Abstract: This paper addresses how the project-based learning was designed and then implemented in a graduate applied technology course at State University of New York at Oswego. The focus of the course was to engage students to produce projects that were authentic, meaningful, and intended for future teaching and professional use. This paper outlines the course content, provides an overview of the processes involved in developing the project-based learning activities, and reports the responses of students in the course on effectiveness of learning process and perception of technology integration on completed projects. Discussion for using project-based learning and examples of students' projects (educational web review, WebQuest, and web-based portfolio) are included.

Introduction

Project-based learning is frequently used by educators. Why the interest in project-based learning? Research shows that project-based learning can capture the complexities of real life situations. Not only does it provide an effective way for students understanding the connection of knowledge to the contexts of its application, but it also provides students with opportunities for self-reflection and a sense of agency. Essentially, project-based learning is based on tasks, groups, and sharing. It provides a practical method of combining many of the elements of authentic activities and collaborative learning (Wheatley, 1991; Grabe & Grabe, 1998).

Although technology provides many opportunities for classroom projects, we often find that students who completed the projects with technology learned relatively little from the hands-on activities of simply "doing" without "understanding". In such cases, students are busy taking actions without appropriate reflection and deep learning. Barron and the Cognition and Technology Group at Vanderbilt (1998) have identified four major design principles that appeared to be very important for project-based learning: a). defining learning-appropriate goals that lead to deep understanding; b). providing scaffolds such as beginning with problem-based learning activities before completing projects; c). including multiple opportunities for formative self-assessment; d). developing social structures that promote participation and a sense of agency (p. 306). This paper describes the adaptation of these 4 principles into a graduate applied technology course at State University of New York at Oswego in which students were required to complete authentic, meaningful projects.

The Study

The Course "Educational Topic: Multimedia and Internet for Education" was offered in summer 2000. The class was restricted only to graduate students and was limited in size (17 students, 9 males and 8 females). Students and instructor met 3 hours twice a week for 6 weeks at computer-enhanced classroom.

Learning-Appropriate Goals

Technology especially multimedia and Internet has been changing and growing very rapidly. In order to avoid "doing without understanding" and to foster focused inquiry, three interrelated and graduated "learning-appropriate" goals were developed for the class: 1). Search and evaluate Internet educational resources; 2). Structure Internet inquiry activities via multimedia tool; 3). Design and develop educational web. These goals helped students reflect on the technology integration, and helped them direct their learning. Furthermore, students were willing to learn how to achieve these goals since they could make easy connection between what they were learning and what they were going to apply in the real world. Specifically, students were required to complete three projects to reach these three learning goals:

1. The educational web sites evaluation report (the first goal)
2. The inquire-oriented multimedia WebQuest project (the second goal)
3. The web-based educational portfolio or educational project (the third goal)

These projects were enhanced each other in contexts and skills and balanced the difficulty of implementation.

Scaffolds Before Initiating Projects

Most students entered the course either with little exposure to multimedia and Internet applications or with limited skills and understandings needed to integrate technology into their teaching and learning. Previous research indicated that it is crucial to create a foundation of necessary concepts and skills for hands-on program (Yang, Shindler, and Keen, 2000). To initiate each of three projects, instructor started with a simulated problem in the form of linear or open-ended project. This scaffolding served two ends: the first end was to share the related concepts/knowledge and particular technological skill that students needed to prepare their undertaking actual projects; the second end was to help student reflect and discuss the possibilities for extending the ideas and technologies into real world projects. For example, after students applied search strategies and educational web evaluation standards to complete their educational web review report project, instructor challenged students by asking how to implement the relevant Internet resources into curriculum and lesson plans, and how to engage learners in "active" involvement with those Internet resources. To seek the answers, Instructor initiated and developed a multimedia slide show "What eveloping multimedia presentation, the WebQuest -- an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet was introduced, six attributes of the WebQuest (introduction, task, process, resources, evaluation, conclusion) were discussed, and multimedia application components were demonstrated. Following the open-ended scaffolding, students were teamed into groups. They began their WebQuest projects on the more flexible levels of skills, understanding, and complexity. The instructor mainly staged in the role of resource providing "just-in-time" suggestions/guidance on the aspects of contexts and technical parts.

Opportunities for Formative Self-Assessment and Revision

Formative self-assessment is one of the most effective ways that promote the quality of the project-based learning. Through formative self-assessment, students get opportunities to see how they are doing and to revise their learning processes as necessary (Barron et al., 1998). The instructor facilitated formative assessment by taking two approaches. Internally, students were working on each common project – web review, WebQuest, and web based educational portfolio or educational project at the same period of time in the same computer classroom. With this common ground, students were encouraged to make communication in the process of completing projects. They were actively sharing the ideas and solution strategies that might be insightful to revise their projects. Externally, the instructor supported the assessment and revision process by providing content related resources links on the class web site (http://www.oswego.edu/~hyang2/edu). These resources allowed students to compare their projects with projects generated by others around the country who have been working on similar ideas.

Developing Social Structures That Promote Participation and a Sense of Agency

There are many ways to establish active, reflective learning. Allocating time for students to present their ideas, methods, and products is one of the most powerful ways. This is essential not only at the conclusion of a project, but also as the project grows. Presenting projects is an authentic activity that provides an enormous motivation for students (Wheatley, 1991; Grabe & Grabe, 1998). According to Barron and the Cognition and Technology Group at Vanderbilt (1998), "presentations, coupled with authentic outcomes and fairly explicit criteria for what counts as a good plan, can provide a strong incentive to prepare and revise" (p. 286). For this study, when each project was done, the instructor required students to present their products in front of the class. Class interactions and classmates' reviews were generated during and after the presentations. In addition, after the class presentations, students' projects have been published in the class web site for students' future reference and other classes' access (http://www.oswego.edu/~hyang2/edu/studentproject.htm).

Findings

Findings from final written reports reflected positive student reactions in project-based learning. Following are three major positive effects:

- The usefulness of extended learning. Students addressed that interrelated learning-appropriated goals, authentic projects, and interactive learning atmosphere made them emerging as active, engaged learners. One student wrote: "I think the process of web resource research and review to the ultimate creation of the web made sense. We layered on our skills with each new project using the newly learned skill by applying it to the next level… The decision to work in a team helped me achieve my goal of learning, while my partner and I brainstormed to accomplish tasks. Being able to work together took the anxiety out of the way, so learning could be primary. Additionally, after projects were presented the class was able to discuss and with that we learned more."
- The effectiveness of production. Most students indicated that working on their own real and related projects made their understanding deeper than simply "doing and missing". One student addressed: "I was pleasantly surprised and amazed on how knowledgeable my colleagues are within their own content area. I was very impressed on the quality of work that was given to you by your students just in six weeks. To have this information at one's fingertips would be invaluable. Not only is this information good within the content area, but also it would be great to have to share it with other teachers outside my content area. I would like to share this kind of information with teachers who do not use these techniques, and show them that it can be done very easily with a little time and dedication. These new techniques could revitalize some teachers' careers and make the classroom enjoyable again."
- The proficiency of technology integration. Written reports from students showed that by experiencing project-based learning, students knew how to locate, evaluate, and use information and technology effectively. One student reported: "I know that we may only touch the part of multimedia presentation, WebQuest usage and website design. But I'm comfortable enough to continue to explore the possibilities of becoming more proficient with these technologies. I loved what I learned; my challenge is how to incorporate them into my content area. I think integrating technology into the classroom is very important and now I have some good ways to build a curriculum upon and become a more successful teacher."

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Creating a Web-Based Curriculum Tool:
Helping K-12 Teachers Harness the Potential of the World Wide Web

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Abstract: The World Wide Web offers a great deal of potential for enriching the teaching and learning experience in the K-12 classroom. In many cases, however, teachers lack the time and skills to locate resources on their own. What can be done to help teachers and students take better advantage of the Web? Using the Algebra Resource Center (ARC) as an example, this paper will describe three areas of focus that can improve the effectiveness of sites designed as content area portals for classroom teachers—filtering, organizing, and correlating content to state standards; providing "real world" context for exploring content; and working to build a community of new and returning users.

Introduction

Resources available through the World Wide Web offer great potential for enriching the teaching and learning experience. A question we might want to ask, however, is—why has this potential not turned into reality? A recent *Business Week Online* article (Symonds, 2000) indicates that "Schools have rushed to buy computers and plug into the Net, but most students still don't use the Web much and most teachers don't either." The article indicates that about 16% of teachers use the Internet as a resource for developing lessons and around 30% require students to use the Internet for research. Articles by Hoff (1999), Roschelle and Pea (1999), and Trotter (1999) all indicate that teachers need help locating resources, developing technology integration ideas, and improving their skills with technology in general.

What can be done to help teachers and students take better advantage of existing web-based content? Offering the Algebra Resource Center (ARC) as example, we will explore three functions that portals developed for K-12 teachers can serve. While the ARC website focuses on resources for Algebra I teachers and students, the concepts discussed here—filtering, providing context, and building community—are relevant to any content area.

Making the Web More Accessible

Filtering. One of the primary services provided by ARC is locating relevant resources and organizing the results in an accessible format. With the rapid growth of the Internet (over a million new web pages per day by some estimates) searching for relevant information and sifting through the results is an increasingly difficult task. The literature, and our own experience, indicates that teachers do not have time, and often lack the technology skills (Hoff, 1999; Roschelle & Pea, 1999; Symonds, 2000; Trotter, 1999), required to wade through the nearly infinite quantity of information available on the Web for any given subject.

Mindful of the limited time that teachers have to spend sorting through resources, ARC staff members work to locate and organize resources into user-friendly, cross-referenced categories (including a state standards index, topical index, interactive sites, homework help sites for students, and professional resources for teachers). Within each category website links are accompanied by brief descriptions that provide teachers with the information needed to determine whether a certain link or part of the site will be useful to them. Users of ARC have responded well to this approach. Related to the use of website descriptions, a user commented, "Otherwise you are on the computer all the time looking at what it's about, but if somebody has done that for you it's going to save time." Another user ore thought into it than other people have...like in the activities section you say that 'this could be tied in here.' It eliminates a lot that isn't useful to teachers."

Providing Context. With the Web, teachers and students have access to more information than ever. While there are a variety of education specific sites that provide activities and lesson ideas, what makes the Web increasingly beneficial is the potential for bringing "real life" applications of content into the classroom. A major challenge for teachers, regardless of content area, is helping students recognize the relevance of what they are learning. While the standards movement has helped clarify what should be taught, it has at times led to the teaching of isolated components at the expense of application—breaking the curriculum down into small parts or skills to be mastered.

One of ARC's primary objectives is to provide resources and instructional ideas that will allow students and teachers to explore algebra concepts in the context of "real world" situations. The massive amount of data available online, for example, is a primary candidate for exploring everyday needs for using algebraic concepts like graphing, working with matrices, or solving equations. Students can access up-to-date sports statistics and see the equation for calculating a quarterback rating in football. An online source for Hollywood box office data can be the starting point for exploring the usefulness of matrices, and the results of this exercise can be represented graphically. Users also indicate that this approach is helpful "to get the student out of the daily book routine," and have found the inclusion of sites like the one for "Major League Baseball" as "a good place for finding statistics." The possibilities are virtually endless.

Building Community. In the process of developing, revising, and updating ARC we have spent a considerable amount of time sharing the website with teachers throughout the state. Early in the development process a teacher asked, "How are you going to let everyone know that it's there? How are you going to get all the algebra teachers in Virginia to find out about this?" ARC staff quickly recognized that simply putting the site online would not be enough to attract new users and keep them coming back.

Since going online in early February 1999, building community has become a much greater focus for ARC staff. Teachers need to know that the site is out there and many need some degree of assistance getting started. During the past eight months we have been spreading the word about ARC through informational brochures, school district newsletters, focus group discussions, and regional conference presentations.

Feedback has been positive, and the site is growing. A summer workshop attendee wrote, "I enjoyed the workshop we attended because it made me sit down with someone who could help me get through some of my computer difficulties. I have visited this site before but never for more than 5 min. Today, I finally realized what a wealth of resources are not only available but categorized for our use. What a time saver."

Our interest in building community goes beyond our efforts to build an audience. We also want to get teachers actively involved. There is no better source of instructional ideas for a given content area than the teachers of that subject. This simple but powerful notion is at the core of our hope that ARC will be able to serve as a valuable communication tool for sharing and interaction of and between the state's Algebra I teachers. While we are encouraged by the site's use by teachers in search of useful curriculum augmentation, we have hopes that the site will become more of an electronic meeting place where teachers will come to interact with their colleagues. Our online discussion forum is the starting point toward our vision of ARC as a true community of practice for the state's Algebra I teachers.

Conclusion

It is our belief that ARC has helped make the World Wide Web more convenient and useful for Algebra I teachers. While we are excited about the site's contributions to Algebra I pedagogy, it is the generalizability of ARC's three-pronged focus that we hope might influence website design/construction in other content areas. Our efforts support the notion that web-based curriculum tools employing the three functions highlighted in this presentation—filtering and organizing content-specific resources, providing "real world" context for exploring content, and building a community of users—can be valuable assets for classroom teachers.

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Virtual Learning Center: Online Tools Support In-class Teaching

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Abstract: This interactive session presents "old teaching techniques in new packages." It presents an approach to transforming teaching activities, which is economical and does not require too much extra time on the teacher's part exceptions in the world of modern faculty development in technology use and application. It demonstrates how teachers can create a Virtual Learning Community of online tools and resources to provide an electronic infrastructure to support their in-class teaching. This Virtual Learning Community can be used by elementary, secondary and post-secondary teachers, as well as teacher educators to transform traditional teaching practices into more effective "asynchronous" online activities, that frees up valuable class time for higher order cognitive activities and for social learning experiences. The tools we demonstrate are low-cost, free, or widely available already in schools, so our Virtual Learning Communities approach can be implemented in almost any teaching setting by any teacher who uses email and the Internet on their own. This is a practical, no-frills approach to modernizing your teaching.

Support that makes sense without expending lots of dollars

We have used and taught faculty how to use a variety of software and hardware and telecommunications tools over the years. In the early days of personal computing, networking, Internet, and telecommunications, just having faculty who had seen or used individual software or hardware tools was an important goal of faculty development. What we have observed, is just as the level of computer experience and the baseline competencies of incoming students rises over time, with increased access to these tools in school and at home, and more effective integration of these tools into teaching especially in the elementary and high schools, so the average competency of teachers as computer users is increasing.

We have also observed that teaching faculty how to use complex software, such as Director, or Dreamweaver, takes more than just the hours of a workshop. Faculty who attend software workshops, but then do have the time and opportunity to continue to use and practice and learn the software, are unable to put their workshop knowledge to use in practical ways that assist them in their teaching. This can be frustrating for the faculty and counterproductive for schools and institutions that are seeking to provide opportunities for faculty development.

However, if our faculty development efforts step back from the cutting edge of technology, and revisit our roots in pedagogical practices and what we know about "what works" in teaching, we can provide effective faculty development that will allow the integration of technology into typical classrooms quickly and effectively.

Thus in our work in faculty development and technology, we now combine simple, widely used tools, like email, and Internet browsing or, in new ways that make what teachers have always done (assign homework, give students individualized feedback, make interesting assignments) more effective. We call our idea of how to use and apply the tools creating a Virtual Learning Community (VLC.) The VLC is a set of tools that create an online infrastructure that supports a teacher and the students in a traditional classroom. It can be adapted to classes with no in-class access to computers and to those that meet in computer labs. It has been our aim to look for tools that are low-cost, free, or readily available for other purposes to make the parts of the VLC. This way, we provide faculty with the means to transform several time-honored pedagogical practices into new forms that make use of what computers and digital technology do best, and thus free up important in-class, "face time" with students so that teachers can engage in higher order cognitive activities with their students.

Why this Works

Time on task is the strongest predictor of student achievement. If teachers can monitor homework and out of class time more effectively with online technologies than was possible previously, they can gain more "face time" with students to pursue higher order learning. Student motivation, another predictor of achievement, increases with the perception that the teacher is interested in work completed between classes, and is maintaining contact with them out of class. The faster we can provide feedback to students about their learning, the more effective that feedback is. The techniques we demonstrate in this interactive session are easy to learn, can be done with inexpensive software tools, and allow teachers to create an online infrastructure to transform the way they teach by transforming the way time is spent on class activities in and out of class. The tools simply update time-honored teacher practices for the 21st century. It is the ubiquity and ease of use of the Internet and its tools that will bring educational ideas about how computers can assist learning into the mainstream in ways that previous incarnations of CAI were unable to do.

Integrating several telecommunication features into what we call a Virtual Learning Center, teachers can monitor lower order cognitive learning during out of class time, and thus free up more "face time" in the classroom to pursue higher order activities. Scoring and grading can be done immediately, and students can see how they did without waiting until the teacher wades through all the work to be graded. Assessment of higher order learning, which is more complex and requires the teacher, gets more time, because time-consuming lower-order assessment can be done via the online infrastructure. We unify the use of email lists, online forms (mail-in types and automatic feedback types), and simple teacher-created web assignments (from annotated HTML bookmarks)

What You See is What you Learn

In our interactive session we will demonstrate several of our techniques. We sill show how to use email to keep students involved in class between class sessions, how to create online assignments that make students' use of the Internet an effective learning experience (not just a surf session) and how to create online forms to collect reflective student responses. Additionally, participants can view demos of tools they can easily use (in terms of their own skills, and in terms of being able to afford these tools) to see how to create online self-evaluations that provide students with corrective feedback and how to create quizzes and tests that are scored and graded automatically, as well as variations of these techniques.

Most of the tools we use are free, low-cost or at least readily available to educators (e.g. Netscape Composer, MS Office, www.discovery.com teacher tools) and we focus on how to use technology to speed up things like scoring tests, so more time can be spent on learning activities. None of the techniques or tools that we present are original to us. That is the beauty of our Virtual Learning Communities. These are not new ideas that need to be tested. These are applications from technology to solve problems and speedup bottlenecks that have existed and impeded common teaching activities in ways that have been viewed as endemic.

Educational critics often say that a doctor from 100 years ago would not recognize a modern operating room, but a teacher of 100 years ago would feel right at home in the modern classroom. The introduction of networking and computer technologies began the transformation of the classroom in the same way that the operating room has been transformed. In order to continue that transformation, we need to enable teachers to perform simple, basic, teaching activities in new ways, enhanced by technology. This interactive workshop will demonstrate how to do this, and set many attendees on the right track to transform their own classroom or school for our new century.

We can help you if you are...

The audience for this interactive session can consist of teachers and administrators who routinely use email and the Internet outside of their direct teaching activities. This session is not designed for teachers with no Internet experience, or those who have created extensive websites or developed online classes. Teacher Educators should find this an interesting and exciting session, provided they have the prerequisite skills.

The learning objectives of the interactive session are that participants will be able to create email lists for their classes and compare and contrast the use of this kind of email with listserv and one-on-one email. Participants will be able to describe the community building aspects of this tool. Participants will be able to create, reorganize, and use bookmarks (favorites) to create interactive, active assignments for their students. Participants will understand how the vision of Vannevar Bush underlies this tool, and its importance in modern academe. Participants will be able to create an online form in several ways (using hosted tools or a word processor or an HTML authoring program to create the form.) Participants will understand the difference between "post" forms that have their contents returned as email, and forms processed via CGI and other applications that return data that has been graded or evaluated to the form creator.

The software used in this interactive session is Netscape and Netscape Composer, teacher tools from several online sites, such as: (http://school.discovery.com/quizcenter/info/userguide.html), Microsoft Office, and Dreamweaver. Prior to the interactive session, we will provide an example of a Virtual Learning Community, to support the Interactive Session and as a resource for the participants. You can view supportive materials about the theories underlying our work, and Virtual Learning Communities at http://acweb.colum.edu/users/biverson/fipse

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USING AN ELECTRONIC DISCUSSION BOARD TO SUPPLEMENT CLASSROOM SESSIONS WITH POST GRADUATE TEACHER EDUCATION STUDENTS

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USING AN ELECTRONIC DISCUSSION BOARD TO SUPPLEMENT CLASSROOM SESSIONS WITH POST GRADUATE TEACHER EDUCATION STUDENTS

ABSTRACT

When the postgraduate computer education programme at UNITEC Institute of Technology was developed it was considered essential that it be accessible to students in full time employment. Consequently all classes are held at weekends and Blackboard Course Info is used to facilitate student-student and student-teacher interactions between classes. This paper outlines the structure of the programme, profiles the students, explains the approach taken by the lecturers, and reviews the learning experiences of staff and students in three classes.

Keywords

Postgraduate computer education programme, electronic learning support, student evaluations.

1. THE PROGRAMME

The postgraduate computer education programme at UNITEC Institute of Technology was approved by the New Zealand Qualifications Authority in December 1999 and classes began in February 2000. Students may complete a Postgraduate Diploma, consisting of two compulsory courses and six optional courses, in one year of full time study (or the equivalent part time). The Master's degree requires four compulsory courses, and either three optional courses and a thesis or seven optional courses and a dissertation; it may be completed in two years of full time study (or the equivalent part time). At present the optional courses focus on networks, instructional technology, interactive multimedia, and the Internet.

2. DELIVERY METHODS

To accommodate the needs of students in full-time employment, classes are held at weekends. Each course meets on four weekends, about a month apart, for four hours on Saturday and four hours on Sunday. The lecturers use a range of approaches, including lecturer presentations, student presentations, group work, electronic discussions and individual communications (by email, telephone or face-to-face). The students complete three assignments per course, some as individuals and some in groups. There are no final examinations.

3. THE COURSES

The first course under review is called The Impact Of Information Technology On Society (referred to as 801 below): it explores past, present and future impacts and ethical issues. It was anticipated that few students would have much experience of exploring social issues, which made it very important that they have plenty of opportunity to discuss ideas and situations, both in class and between classes. For that reason, the lecturers reminded the students at all class meetings to use the discussion board to supplement face to face interactions. The course ran twice (once in each semester) with very different student groups.

The second course under review is called Pedagogical Strategies for the Use of Information Technology (referred to as 817 below): it explores how information technology may best be used in teaching and learning. Most of the students in 817 had been in the first semester 801 class. One of the three lecturers is the 801 course coordinator, another is based in Melbourne and flies over for three of the four weekends.

4. THE STUDENTS

In the first semester 801 class, the 16 students included five computing practitioners, five tertiary teachers, two secondary teachers, two technical support staff, a librarian and a sales representative. Four of them already had postgraduate qualifications, another five had bachelor's degrees, a further five had diplomas at various levels and the remaining two had extensive credits towards bachelor's degrees. All had significant practical computing experience (from six to 20 years) and all but two had English as their first language.

The second semester 801 class consists of 32 students whose first language is not English. Eight students already have postgraduate qualifications, one has an undergraduate diploma and the remaining 23 have bachelor's degrees, mainly in science or engineering. Not many had more than three years practical computing experience.

The 817 class consists of four secondary teachers, three tertiary teachers and a computing practitioner. Three of them already have master's degrees, another three have bachelor's degrees, and the remaining two have diplomas. All but one have English as their first language.

5. THE 801 DISCUSSION BOARD IN SEMESTER 1

Two weeks before the first weekend meeting, the discussion board was initiated and students were invited to give some personal background and explain their interest in the course. Six students responded before the first weekend and seven more followed shortly after. Over the 20 weeks of the course active participation in the discussion board varied greatly (we can only speculate about the activities of "lurkers" - students who followed the discussions, but did not contribute).

Altogether 172 student contributions were made (an average of 11 per student). Some contributions were very brief (for example, asking for a definition, giving a URL or acknowledging a response) and some were quite extensive (for example, arguing a case or recounting an anecdote). The most active contributor (38 postings) was a computing practitioner with 22 years of experience. The next (25 postings) was a librarian. Only one student, a member of UNITEC's IT support staff, did not contribute at all. The biggest occupational group consisted of teachers (5 tertiary and 2 secondary), who might have been expected to be major contributors. In the event their contributions ranged from one posting to 15. A further 14 postings were made by the lecturer.

6. THE 801 DISCUSSION BOARD IN SEMESTER 2

Altogether 128 student contributions were made (an average of four per student). The most active contributors (a computing practitioner from India and a recent graduate from Sri Lanka) made 13 postings each and three students did not contribute at all. A further 26 postings were made by the lecturer. When compared to the first semester course, the student contributions tended to be briefer (which may reflect the language skills of the students) and the lecturer tended to respond twice as often.

7. THE 817 DISCUSSION BOARD

Altogether 101 student contributions were made (an average of 13 per student). The most active contributors (a computing practitioner and a tertiary teacher) made 30 and 29 postings respectively and one student (a secondary teacher) did not contribute at all. A further 29 postings were made by the three lecturers. When compared to the 801 classes, the contributions tended to be longer (which may reflect the language skills of the students and the nature of the subject matter) and the lecturers tended to respond more often (particularly the lecturer who only sees the students at weekends).

8. STUDENT EVALUATIONS

At the end of the first semester 801 course the students were asked to rate the usefulness of the different components of the course. When their responses were combined, scoring 1 for "not at all useful", 2 for "not very useful", 3 for "quite useful" and 4 for "very useful", the following ranking emerged:

3.8 whole class activities
3.5 assignments / internet / newspapers / clippings
3.4 journals
3.2 group work
3.1 books
2.8 discussion board / survey analysis
2.7 survey construction

It seems clear that this group of students valued their classroom interactions and various forms of print and electronic resources more highly than the electronic discussions. Comments about what they liked best included:

"Discussions - expertise of lecturer and participants"
"Group discussions and participatory nature of the course"

At the end of the second semester 801 course, more student evaluations were conducted with the following results:

3.7 internet
3.1 assignments
2.7 newspapers / clippings / journals
2.5 whole class activities
2.3 discussion board
2.2 books
2.0 group work / survey analysis

Whole class activities and group work with this class were not as lively and effective as they were with the semester 1 class (possibly because of language), so it is not surprising that they were rated lower. On the other hand, the semester 2 class rated the internet well above other resources, and it was the only component that they rated higher than the semester 1 class did.

9. CONCLUSIONS

Given that the students were busy people (many of them in full time employment), who only met as a group on eight occasions and were otherwise widely dispersed, the discussion board proved helpful in maintaining student-to-student communication between class meetings. The lecturers also used Blackboard Course Info to make electronic announcements (an average of one a week) to keep students informed (about logistics, resources and deadlines) and give general feedback about assignments. However it is clear from the student ratings and comments that they enjoyed meeting face to face and saw the electronic components of the course only as a useful support and supplement.

PREPARING TEACHERS TO COMPLEMENT MIDDLE-SCHOOL CURRICULA WITH WEB-BASED ENVIRONMENTAL HEALTH RESOURCES

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ABSTRACT

The College of Veterinary Medicine at Texas A&M University has teamed with the Center for Rural Public Health and the College of Education to develop science curriculum and teacher training for middle-schools in rural and under-served parts of Texas. Our approach is to use the World Wide Web to provide environmental health information at a middle-school level and to train teachers to complement their regular teaching with the information, learning activities, and experiments developed by our scientists. The curriculum receives on-going evaluation and revision. The program also includes in-class visits by scientists to the schools.

Completed to date are Web sites on Cell Biology, Environmental Hazards, and Water Quality. Under development are sites on Organism-level Biology and Hazard Properties, Assessment, and Remediation. Each module provides didactic information and hands-on activities for the students and extensive "teacher pages" that include lesson plan, explanation of learning activities, Internet tools for the teacher, and identification of the state learning objectives that are addressed. The Web site URL is: http:\\peer.tamu.edu

We will build on this life science core with a seven-year program to create Web modules that can help integrate environmental health science into all middle-school teaching, which in Texas includes economics, English, general science, geography, government, and history, in addition to math and science.

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RATIONALE FOR THE PROGRAM

Although Texas has received good reviews for its educational reform efforts, reform in Texas is complicated by the fact that it is such a large state with only a few major population centers. The school districts in Texas are spread over great distances and in many cases lack direct access to enriching educational opportunities that are available in large cities. Rural children in Texas encounter serious environmental health situations, but their schools are less likely than metropolitan schools to receive state-of-the-art instruction in environmental health. Enriching rural-school education via the World Wide Web seems to be an obvious and necessary need.

Educators commonly view middle school as a crucial stage in a child's education. In Texas, middle school is a turning point in the lives of rural children when they may either drop out of school or become motivated for a lifetime of learning. Given the relatively poor performance of U.S. students in science, we believed it was appropriate to focus on science. But not science as it is usually taught, which is often perceived by students to be abstract, arcane, and just plain boring. In particular, we believe that students can become more interested in science if the relevance to their daily life were more evident, as is possible with environmental health issues.

Additionally, there is a great need in Texas for teacher training in science. Only in recent years have new teacher graduates in Texas been required to have an academic major in their teaching area. It is not uncommon to find science teachers in Texas who have no science background.

We also recognized the crucial requirement of cooperation and buy-in from teachers and administrators. Therefore, we arrange for teacher training in the science issues, provide scientist visits (when invited) to schools, have advisory panels of teachers and school administrators across the state, and consult with officials of the Texas Rural Systemic Initiative and the Texas Education Agency.

The Curriculum

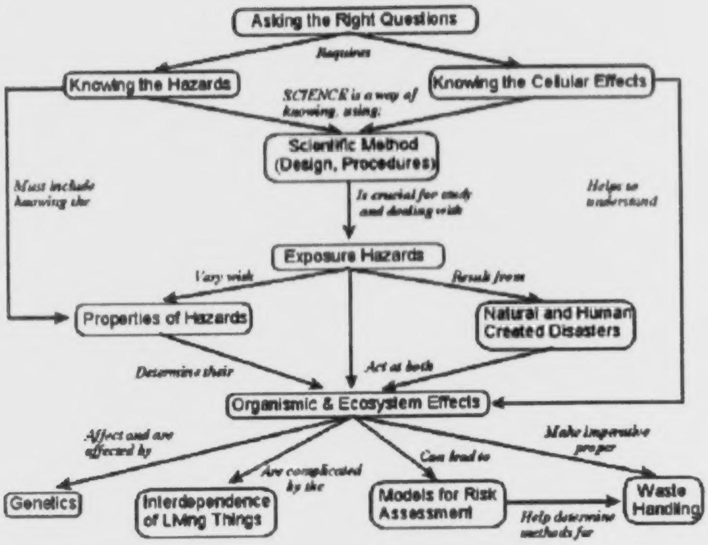
Several key features characterize our approach:

- didactic material written by scientists in coordination with curriculum designers
- instruction tied to state-mandated learning standards
- experiments and other "hands-on" activities
- scientist visits to schools
- consultation from a panel of middle-school teachers
- a computer conferencing system that supports collaborative learning and interaction among students and with professors
- comparison of pre- and post-test scores for each given module as a measure of what has been learned
- on-going evaluation of revision of the program and instructional materials

Basic Life Science Curriculum

A three-year federal grant sponsors the development of instructional material for grades 6, 7, and 8. Materials must contribute to State learning standards, known as the Texas Essential Knowledge Standards. Figure 1 shows a concept diagram that is guiding the development of the modules.

Three modules have been completed (Water Quality, Cell Biology, and Environmental Hazards)(see peer.tamu.edu). The water quality module emphasizes a series of experiments on water quality. These are supported by giving commercial water quality test kits to the schools. The cost, over $300 per kit, is borne by the grant and donors. Students perform and evaluate measurements in the following lessons: Lesson 1: mass, fluid volumes, and concentrations. Lesson 2: temperature and its effects on water quality. Lesson 3: dissolved oxygen and its effects on water quality. Lesson 4: pH and its effects on water quality. Lesson 5: nitrates and their effects on water quality.


Asking the Right Questions
Requires
Knowing the Hazards
Knowing the Cellular Effects
SCIENCE is a way of knowing, using:
Scientific Method (Design, Procedures)
Must include knowing the
Is crucial for study and dealing with
Helps to understand
Exposure Hazards
Vary with
Result from
Properties of Hazards
Natural and Human Created Disasters
Determine their
Act at both
Organismic & Ecosystem Effects
Affect and are affected by
Are complicated by the
Can lead to
Make imperative proper
Genetics
Interdependence of Living Things
Models for Risk Assessment
Help determine methods for
Waste Handling

Protein Machinery" (protein synthesis and function), and "Code and Translate Instructions" (genetics). There is also an introductory lesson on "Levels of Organization" to put things in perspective. We attempt to teach these difficult topics at the middle-school level, and feedback from the teachers so far indicates that we might have succeeded. Each unit begins with a section of "How We Find Out," which explains in simple terms the kinds of observations and experiments scientists make to learn about the cell function under consideration. Then there is a section, "What We Know" that summarizes what we know about membranes, energy production, etc.. Finally, there is a unit, "Why Does -school children should be interested in knowing these things. Also associated with each unit are activities and experiments, short essays on common toxins that affect the cell function under consideration, and a short biography of a famous scientist, with emphasis on his/her childhood, who made major discoveries in the topic. In addition to pre- and post-quizzes, there are electronic flash-card questions using a new game-like system that we developed (Get Smart: www.foruminc.com/getsmart).

The Environmental Hazards module has five units. One, a general introduction to environmental science, explains the flow of energy from the sun through the various levels of the food chain and covers carbon cycle, nitrogen cycle and water cycle. There is also a section on the relationship of exposure, toxicity, and risk in environmental hazards. A second unit explains the rules for food safety and identifies sources of food-borne illnesses and contaminants. The third unit common covers indoor air-borne illnesses and contaminants and teaches children about outdoor air-borne illnesses and contaminants. A fourth unit teaches about the skin, and helps children learn to minimize their exposure to pesticides and herbicides and to the sun's ultraviolet rays. There is also a section on parasites. The fifth unit emphasizes good nutrition and identifies health problems that can occur through poor nutrition. Each unit has an activity that is an electronic sleuth game, "Toxic Island," in which students must solve environmental health problems.

BEST COPY AVAILABLE

BEST COPY AVAILABLE

Modules now being developed include an extension of the Hazards instruction to include chemical properties of hazards, risk assessment, and remediation, and an organism-level module oriented around the theme of what kinds of things organisms must do to survive and thrive in this world.

Integration of Life Science into All Middle School Instruction

A second grant supports a new initiative to incorporate multi-media environmental health instruction into the teaching of English, social studies, math, and general science. We hope to work with TEAMS of teachers in local schools, with the science teacher acting as a focal point to assist the other teachers in the integration process.

This curriculum will be problem based. State tests indicate that critical thinking and problem solving are common areas of weakness. We plan to hire a professional writer to create a 20 min read story line, with child characters, as they go on an imaginary journey in time or to different geographical areas. Each stop along the way constitutes a new adventure in which the children are confronted with an environmental health problem. For example, one adventure now under development is at Luxor, Egypt, where the slaves who are building the pyramids suddenly come down with a sickness characterized by vomiting and diarrhea. The science teacher would help direct students to information on food safety, water quality, and infectious disease. The math teacher might develop exercises based on the geometry of pyramid building. The social studies teacher might deal with the geography of the Nile River basin, the politics of Pharoh-dominated culture, and the life styles of Egyptian slaves. The English teacher might require additional reading or call for persuasive essays defending a particular view of the problem and its resolution.

These modules will include activities for testing, calculation, reading/writing, role playing, and development of problem-solving skills.

TEACHER TRAINING

Teachers receive training in several ways:

- Summer Short Course. We host a one-week intensive training session in the Summer. Teachers learn computer and Internet skills, meet the scientists and instructional designers, and learn and critique instructional materials. Teachers actually perform (and de-bug) the hands-on activities and experiments.
- Internet Conferencing with Scientists. Biographies of participating scientists are posted on the curriculum web site, and teachers can know whom to contact for questions or suggestions. A Web-based, asynchronous conferencing system, FORUM, is being developed that will allow shared editing of Web pages and in-context annotation (see www.foruminc.com for current implementation).
- Scientist Visits. Informal exchanges occur during the scientist visits to local schools.
- Teacher Pages on the Web site. Each curricular module has a set of Teacher Pages that help explain the material and show how the materials can be used. Worksheets can be downloaded for students to use in reporting their activities and experiments.
- Web-site Instructional Resources. The peer.tamu.edu site contains various links to resources on Environmental Health Science Education for teachers and students. These web sites are packed with fact-based information and fun-filled curricula. There is also a link to the TrackStar site

(http://scrtec.org/track/ http://scrtec.org/track/ enables teachers to create easy-to-use Web lessons and presentations or to use ready-to-go lessons created by other teachers.. The PEER site also links to a collection of environmental health lessons that are created by the teachers who participate in our Summer workshop.

- Curriculum Evaluation Feedback. As feedback is received from the teachers, the feedback will be shared with everyone for general dialog and debate in the FORUM conferencing system.

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Designing Activities in Networked Classrooms at the Micro, Meso, and Macro Levels

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Abstract: University- and school-based teacher educators, pre-service teachers, and educational researchers/learning scientists are seeking to develop thoughtful and effective uses of information and communication technologies (ICT) in networked classrooms across settings in Canada and elsewhere. At the micro level, they design creative, engaging, and productive online activities for collaborative learning and teaching purposes, ones increasingly focusing on knowledge building. At the meso level, they facilitate new adopters' transition to networked classrooms; once technology is in place and working, the advancement of pedagogy tends to become the object of collaborative inquiry. At the macro level, the vision of interconnected learning communities is guiding the transformative process that is underway. Design principles that were found applicable across sites and levels, and which will guide participation in the Universal Forum of Cultures' Educational Project (Barcelona, 2004), are presented.

Introduction

In 1994, the idea of computer-supported collaborative reflective practitioners inspired the design of a virtual community of support and communication for preservice teachers registered at a number of Canadian universities, located in Quebec City, Montreal, Toronto, and Vancouver. Ever since, participants have helped one another understand why and how information and communication technologies (ICT) may be used in thoughtful and effective ways. These driving questions are explored by different communities, in specific situations, and sharing research results between iterations. Communities of learners, communities of inquiry, communities of interpretation, and communities of practice all bring their contribution to the understanding of being-a-teacher-in-a-networked-world. Participants are student teachers, teachers, teacher educators, graduate students, and other educators from a number of schools, universities, and associations. This paper focuses on the design principles that were found relevant.

A Design Experiment

Our research takes place within emerging practices; we are not external observers of existing practices but, rather, we are co-engineers of practices – or "designs"– that constitute arrangements of processes, methods, and tools with which we experiment systematically (see Ann Brown's concept of "design experiments" in Brown, 1992). As such, we seek to articulate an understanding of practices around learning, inquiry, and interpretation.

Situated learning (Lave and Wenger, 1991) is central to the concept of interconnected learning communities. Lave's concept of "settings for action" (1988, p. 98), and its counterpart, "arenas of activity" helped structure the framework of inquiry: a setting is a process that occurs as the individual establishes a relation with a given arena –arenas for activity are public and durable, existing prior to individuals and, to a large extent, out of their control. The perspective adopted on the continuities and discontinuities in the dynamic relations being established at each site and between sites built on Lave's notion of continuity of activity as an "active production of the reproduction of settings, activities, and selves (1988, p.187), and on that of legitimate peripheral participation (Lave & Wenger, 1991).

The online learning environments, such as Virtual-U, eGroups, WebCT, and Knowledge Forum, bring continuity within and between sites when the same tool is used. But philosophical approaches and teaching skills as well as cultural differences (school culture, university culture, Francophone/Anglophone cultures) are also at play. The posting of artefacts in online public places and invited virtual visitations allow communities using different tools to share interrogations, resources, and research results (e.g., incoming student teachers doing virtual visits of more advanced student cohorts' discussion forums (VGroups); inservice teachers from different schools reflecting on their practices (eGroups); collaborative knowledge building is demonstrated to interested participants from other sites (Knowledge Forum). That is to say that designs of use and social designs (e.g., graduating teachers staying connected after their undergraduate studies, graduate seminars involving participants from different sites) are found important for new continuities to emerge, and create density as far as classroom, school, and wider-system renewal are concerned. What happens when classrooms get networked? How do pre-service teachers, in-service teachers, school-based and university-based teachers interact within and between sites? The relations among people, activity(ies), including resources and tools, and situation(s), as seen through themes and patterns of connection, constitute a primary focus of theoretical interest (Laferrière, Bracewell, Breuleux, and Willinsky, 1997).

Another question being studied also using a design experiment approach (Brown, 1992) is the following one: What knowledge is to be transferred in order to prepare 21st century citizens? This question entails the technical, practical, and theoretical dimensions of learning to teach collaboratively, and learning to learn, in networked classrooms, schools, and wider systems.

Inquiry and interpretation practices

In the enduring contexts of their respective "communities of practice" –and in a movement to create extensions across the traditional boundaries of these practices– educators and learning scientists in the TeleLearning Professional Development School (TL•PDS) are able to design jointly a number of inquiry projects with a fundamental focus on the question: "How can we achieve the full range of sustainable learning and teaching experiences that are relevant to our knowledge society?". Around this inquiry goal, our *communities of practice* shift to *communities of inquiry* which include principally practicing educators, teacher educators, and learning scientists (educational researchers) engaged in discussions to cultivate a common discourse and a common knowledge base on *learning* –as a socially situated and governed constructive process– and on how "technology" –as a system that includes culture and knowledge– can help us achieve superior forms of learning. In the context of this community of inquiry, many activities can occur, one of them being to engage in deliberate *interpretations*: developing and documenting socio-technical processes to identify, capture, organize, and interpret moments from the networked K-12 classroom, where advanced pedagogies, collaborative knowledge building, and technology integration are combined into emerging practices and constitute the focal point of inquiry for the participants. For instance, a range of "recording" tools and shared interpretation spaces can empower teachers to engage in digital "story-telling" within an interpretive community to capture critical events from the circumstances of practice. Technically, this involves fairly common technologies: portable notebook computers, digital video camera, video-editing software, high-speed Internet access; shared web-site, collaborative knowledge building tools. Although these technologies are not "rocket science", for our design experiment it is important to validate their ecology, to articulate their practical alignment in an authentic practice.

The teachers in that setting engage in reflective acts where recording and gathering artefacts is critical to their inquiry goals, organizing them for sustained interpretation with others (resulting in multiple diverging or converging interpretations). Practitioners as well as researchers thus are signaling to each other their emerging practices and the questions they have about them in order to engage in a process of interpretation. It is essential to understand that this interpretive project is grounded in existing networked communities of practitioners and researchers, in relation of trust, sharing common inquiry goals (such as the educators and researchers in our TL•PDS). This community of interpretation is a community whose actions are essentially about sharing experiences, making sense from the "text"[1] of experiences, and where research knowledge is brought to bear. This activity is at the intersection of, on the one hand, narrative-based reflective practice and, on the other hand, "case-studies" or case-based learning. The "story telling" is supported by digital media, the interpretation is using varied online synchronous and asynchronous tools for collaborative knowledge building. Examples of inquiries go from questions of classroom management solutions to support project-based learning in a laptop classroom, to questions about fostering specific understandings in middle-school science with the use of visualization tools, to what constitutes evidence of knowledge building. Thus, we are engineering different socio-technical designs and exploring them, in practice, in order to shape a successful "reflective practice" that takes advantage of current affordances in digital media, shared representations, and collaborative knowledge building.

A Collaborative R & D Process

Higher-thinking and social skills are associated with advanced uses of learning technologies in the classroom (Bracewell, Laferrière, Breuleux, Benoit, & Abdous, 1998). However, the networked classroom means different things to different people. For some it may mean one networked computer and a LCD projector in front of the classroom for the teacher to enhance his or her lectures. For others it may be a classroom whose members have high access to the network (intranet and/or Internet) in and/or out of its walls.

As teacher educators know, workplace contexts affect pre-service and beginning teachers' representations of their role as teachers. For instance, although on campus they may be exploring alternatives to the transmission model of teaching, a traditional school setting is likely to have a decisive influence on their behavior as student-teachers, or as beginning teachers.

The following twelve (12) design principles have progressively been found relevant for designing activities that advance the practice of teaching, and the practice of learning, in networked classrooms:

- **Ease of access.** Networked computers and online resources and tools need to be accessible without loosing too much time once basic technical skills are mastered.

- **Co-constitutionality.** The development of a socio-technical infrastructure relies first on electronic connectivity on the one hand, and on people who value collaborative learning and knowledge on the other.

- **Participatory design.** The development of networking capacity involves university-school administrators (partnerships), university- and school-based teacher educators, in-service/pre-service teachers, and K-12 learners.

- **Local grounding.** Site-based professional learning communities provide grounding. Three were established (TACT, McGill TL-PDS Net, CITE), and connected to the Knowledge Society Network (KSN). Their locus of collaborative inquiry is the networked classroom.

- **Active collaborative learning.** The networked classroom fosters active collaborative learning, rather than individual learning where students/pupils work on computers learning rote knowledge and specific skills.

- **Multi-modal social interactions.** At a local level, learners meet face-to-face, on campus or at the professional development school. Learners also meet online, pursuing locally grounded activities or geographically extended activities. See http://www.telelearning-pds.org

- **The classroom as-a-community of learners.** K-12 learners as well as pre-service and in-service teachers are learning in networked classrooms designed to become centers of inquiry where people, things, and ideas are valued, and where teaching for understanding is a common goal.

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[1] the notion of "text" is here expanded to include complex digital representations and artefacts used to convey rich stories, narratives and explanations.

- **Diversity.** Learning communities are different in their local champions, circumstances, settings, tools, artefacts, cultures, and languages (English, French and, soon, Catalan/Spanish).
- **Progressive distributed expertise.** Virtual collaborative spaces provide opportunities to share resources and expertise to solve complex and ill-structured problems.
- **Collaborative reflective teaching.** The design task is that of providing a collaborative learning environment within which problem-setting and problem-solving are carried out in relation to real classroom events.
- **Collaborative knowledge building.** This refers to the design of a rich learning context within which meaning can be negotiated and ways of understanding can emerge and evolve. Student teachers engage in designing and inventing tasks such as the organization of the networked classroom, the development of learning projects, the scaffolding of online group or classroom conversations, and the creation of case studies.
- **Interrelatedness.** Knowledge objects, events, actors, artefacts, and authors interconnect in ways that add continuity and integration to student teachers' experience as they learn to teach in networked classrooms. They add as well to the experience of practitioners' working in networked classrooms.

The design experiment is now entering a phase where issues of leadership are crucial. We are examining leadership practices that support the participation of teachers in on-line learning communities, how leaders can develop their own learning communities, and how teachers can become leaders in their school or school board related to the use of ICTs to support advanced pedagogies such as collaborative knowledge-building.

The Universal Forum of Cultures, to be held in Barcelona in 2004), provides a rare opportunity for educators to raise their sight, express their humanistic values, and exercise leadership around a productive, constructive set of activities with the aim of realizing the vision and of learning from that realization. Working and thinking together, all participating countries' educators, governments, business leaders and community groups are capable - with the present knowledge, resources and technology - of creating a community, a family of educators, with a common concern for building their education system's capacity in using information and communication technologies (ICT) properly in and out of the school classroom.

From Networked Classrooms to Interconnected Learning Communities

Electronic linkages and associated production instruments (e.g., email, web-page construction, online discussions, online data bases), constitute a powerful vector for learners to exercise the full range of democratic rights, to build and share their understandings with others so that the resulting knowledge is deeper and more robust, to make visible to themselves and to others the wealth of their cultures in ways that allow dialogues and exchanges. Thus, the leadership strategy adopted in coordinating the theme on technology of the Education Project http://www.barcelona2004.org/corporativa/projecte-educatiu/index-gb.htm, builds mostly on this dialogic perspective on new media and information technologies in learning communities, where access inside the community to resources from outside is at the same time allowing the possibility of production from within to the outside and, therefore, stimulates the engagement in responses, dialogues, exchanges, explanations, and the construction of new objects.

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SURVIVALIST GUIDE TO ONLINE COURSE DEVELOPMENT

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Abstract:

Online course delivery is a popular topic in educational circles today. However, little guidance is available in an introductory manner that facilitates the actual development of such courses. In this article, we will provide a systematic approach to developing online courses that will enable beginners to plan and implement an online learning experience. The framework we present involves answering a set of questions that relate to the following domains: learning, teaching, technology, design, support, management, and quality.

Introduction

Online course delivery is a popular topic in educational circles today. However, little guidance is available in an introductory manner that facilitates the actual development of such courses. In this article, we will provide a systematic approach to developing an online course that will enable beginners to plan and implement an online learning experience.

Online course delivery has become a priority at our institution, The Metropolitan State College of Denver. When the college first started putting courses online, many were developed without much thought to design and how to address student learning in the online environment. Over the past five years, however, we've learned many things about online learning and how to provide effective instruction in an online environment.

We believe the key is knowing what to consider when deciding to convert or develop a course for online delivery. A framework we use involves answering a set of questions. These questions relate to the following seven domains: learning, teaching, technology, design, support, management, and quality.

Learning

What kind of course is it? What do your students do? What do you want them to learn? What kind of investment are you looking at in terms of course materials? What performance-based expectations do you have of your students? What are you expecting your students to be able to do at the end of the course? What are the materials and activities you need to have in place to achieve these outcomes? How can these skills be taught in an online environment?

An important consideration in the development of online curriculum is determining the appropriateness of a course for this method of delivery. Consider, does the context of the course deal with a well-defined domain of knowledge, an ill-defined domain of knowledge, or a combination? Each has its own uniqueness and constraints, which will need to be addressed specifically for the online environment.

Teaching

In looking at the content you will be providing in your class, what types of materials do you want to use? Are they text-based such as textbooks or handouts? Are they visual-based such as pictures, photos, slides, graphics, or animations? Are they audio-based such as cassette tapes and sound or music files? Are they multimedia-based such as PowerPoint presentations, films, videos, or software? What materials do you expect the students to have access to?

You also need to consider the types of skills and content mastery that you are trying to achieve. How can you provide for students, in an online learning environment, the experiences they need to meet the desired objectives?

Can you create in an online learning environment a scenario where students can achieve at least equal to, or more than, what can be achieved in a traditional classroom?

Technology

Based on the teaching and learning that you want to occur, does the technology at your disposal and accessible to your students, have the capability to fulfill your expectations? In today's cyberspace reality, there are still subtle differences in computer systems, browsers, plug-ins, and reader software. Let alone, the obvious factors of Internet connection speeds and web server stability and delivery. What are the current limitations? Is your web server supported directly by the institution, a third-party, or is it out-sourced to a vendor? What are the capabilities of the system? What resources do you have at your disposal to develop the course? What is your skill level in using these resources? Does your institution provide training?

Given these considerations, what activities, materials, and resources can you provide your students so that they can meet your instructional goals and intended outcomes? In determining this, think outside of the box. How can you teach traditional skills in a non-traditional manner? For example, lecture in the classroom can be transformed to an audio- or video-streamed lecture online. Class discussion can be accomplished through chat rooms, forums, or white boards in an online environment. Cooperative learning projects and presentations that might typically occur in a classroom situation can be uploaded and made available to students in a common workspace area on the web server.

Design

Are you aware of the design elements that are critical in online instruction? Do you know how to implement the principles of visual design for maximum effectiveness? Are you aware of signs or symbols that may not be recognized, understood, or misunderstood? Are your links clearly labeled and do they serve an easily identified purpose? Is the course and its elements sequenced logically and in such a manner that scaffolds learning? Are the screens laid out in a manner where it is easy for the students to see their options and make decisions about how to navigate the course?

From a usability perspective, does the site function and operate effectively for students? Is the course designed to use bandwidth efficiently? Does the site take into account accessibility issues? What kinds of adaptations might be necessary for students with special needs?

Finally, does the course promote interactivity? While interactivity in an online course may be thought of as only occurring between instructor and student, you may want to think about how you can integrate and support interactivity between students. Including opportunities for collaboration on group discussions or projects promotes a sense of community that mitigates feelings of isolation. We have found in our experience, it is important that students feel that they are part of an extended community.

Support

In what manner is online instruction valued and supported by your institution? This includes both faculty support for development and implementation, and student support for orientation and access. Is the delivery system under your institution's control or a vendor's control? Do you have access to your course materials and email off campus? What procedures are in place for updating course materials? Can you directly update your course materials or do you have to forward changes to be uploaded by another party? Are you expected to provide technology support for your students or is there another resource available on campus or through a vendor? Does the course provide links to online resources? Are links provided where particular software or plug-ins must be downloaded? Where appropriate, are examples of previous student work made available as models? We have found that by providing a frequently asked questions page we can defer many of the common and repeated questions that come via email.

Management

Can you handle communications with students that you never see? Are you able to communicate clearly, difficult concepts, procedures, and thoughts in a format other than face-to-face? Are you willing to give the time necessary to receive and respond to emails and voice mails? Are you capable of providing your students with timely feedback concerning their performance? Are your time management skills such that you will be able to proceduralize your classes in a 24/7 learning environment? (We're not kidding.) Are you able to monitor individual student activity within the course, by tracking course logins, time online, and individual web page access? Does the course have a mechanism in which a learner can be fairly and accurately measured? What evaluation methods are possible, given the constraints of your delivery system? Have you considered performance-based evaluation measures rather than criteria-based assessments?

Quality

Does the course provide clear expectations of what the student is required to do? Does the course reflect best practices concerning design, accuracy, consistency, and usability? Are you prepared to update courses materials on a regular basis? Are you available to respond to student concerns and questions in a timely and congenial manner? Is feedback on student work provided in a timely and informative manner? Are the same standards and level of academic quality applied to the online course as to a traditional classroom? Is an appropriate online instructor evaluation form made available to students for providing feedback to the instructor and administrators?

Within a framework for analyzing course content, factors such as course structure, types of student/faculty/content interactions, learning outcomes, and support systems are essential. It is important that an online course be designed and developed in such a manner that ineffectiveness is minimized and learning is maximized.

Conclusion

In summary, asking key questions, in the domains of learning, teaching, technology, design, support, management, and quality, are crucial in determining your survival in not only developing, but teaching online courses. You must be prepared to honestly evaluate the opportunities and limitations in your unique situation. Developing online courses is not for the lazy, faint-hearted, or weak in spirit. We have found that by networking with other colleagues, collaborating, sharing, and building off of each others' skills and input, we have been able to survive so far (we think).

Support for Models of Acceptance, Adoption, and Use of Distance Education Technologies

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Abstract: The information age has led to increased use of technologies for teaching and learning. Companies, corporations, and organizations are offering courses, seminars and workshops via distance technologies. Universities and colleges need to make significant changes if they want to compete for an increasing number of students who prefer learning via distance technologies. A critical success factor becomes the acceptance, adoption, and use of distance technologies by faculty members at universities and colleges. Planning and implementing change in these institutions must consider the important stages or levels faculty must move through in order to successfully accept, adopt, and use technologies, especially distance technologies. Levels and/or stages are identified from various models, and specific support strategies are recommended to complement these developmental stages leading to acceptance, adoption, and use.

Introduction

The information age is having an impact on education and training throughout the world. We see many corporations, companies, and organizations offering courses, seminars, and workshops via distance technologies. Many use online software-based tools while others are using videotapes, CDROMs, and various teleconferencing technologies. Most corporations, companies, and organizations are offering these courses, seminars, and workshops for their own employees, in order to provide cost effective training and education. However, others exist for sole purpose of providing specialized training or education to individuals, companies, and organizations primarily for profit. Many individuals are enrolling in these courses, workshops, and seminars if they can: 1) afford them financially (or have reimbursement from employers); 2) effectively learn in a particular electronic environment; 3) find the learning valuable for their personal or professional uses. Increasingly more individuals are obtaining training or education in this manner primarily because of convenience of time and/or location. Hence, institutions of higher education really need to ask themselves some serious questions, if they want to be involved in the competition for these students. Most of the questions involve changes in philosophy (vision and mission), operations, and financial commitments.

Many issues that higher education institutions will confront, include image, resources, facilitation, support and quality, which all impact teaching/learning effectiveness. These issues, and others, could be addressed by undertaking a thorough, meaningful, strategic planning and implementation process that will bring about change. The needed changes are not always easy for administrators or faculty in higher education to accomplish. In fact, even when higher education institutions make the philosophical, operational, and financial commitments, often faculty are reluctant or resistant to become involved in using distance education technologies. Hence, we need to understand the decisions and choices faculty make, and how to incorporate the best strategies to ensure successful professional development. These strategies will enable faculty to become successful developers and implementers of distance courses.

Models of Acceptance, Adoption and Use

Faculty members regularly make choices as to the appropriate teaching strategies, materials, and instructional tools to use for their courses. Their choices about what they are currently using or doing, and what they may choose to change, are usually very personal. Personal choices often are based on things like personality type, teaching style, and preferred methods of instruction. A faculty member that is very independent, for example, may not be willing to adapt to the dependence on technology and support staff that is often needed for most effective online courses. Hall and Hord (1987) also indicate that the change process is an extremely personal experience, and how it is perceived by the individual, will strongly influence the outcome. Hence, if faculty do not see significant benefits for using technology for their courses, then they will not attempt to, make a change. The culture of an organization also influences the choices faculty make. If administrators and faculty members are very supportive and encouraging, other faculty will be more inclined to make the personal commitments to embrace and use technology in their courses. Support, encouragement, and guidance comes in many forms, but when it is combined with appropriate, ongoing professional development, it often leads to faculty acceptance, adoption, and successful use technology in their courses.

There has been significant research in the areas of Acceptance, Adoption, and Use of new innovations. Most of this traditional research can be applied to most innovations, including technology. In fact, there has actually been some specific research involving acceptance, adoption, and use of technology. Six out of the models investigated, are presented in this paper. It should be noted that some of these are based more on applied theory than on empirical research. The six models include:

- Stages of Concern (Hall & Hord, 1987)
- Stages of Change (Fossum, 1989)
- Steps in the Innovation-Decision Process (Rogers, 1995)
- Teacher's Stages of Instructional Evolution Using Technology (Dwyer et al., 1989)
- Stages of Learning/Adoption of the Internet and WWW (Sherry et al., 2000)
- Stages for Learning to Use Technology (Russell, 1996)

These models certainly have their differences, but their similarities allow us to make some interesting observations. Specific stages are listed below each of the six models:

Models not incorporating technology

Stages of Concern (Hall & Hord, 1987)	Stages of Change (Fossum, 1989)	Steps in Innovation - Decision Process (Rogers, 1995)
Awareness	Denial	Knowledge
Informational	Resistance	Persuasion
Personal	Adaptation	Decision
Management	Involvement	Implementation
Consequence		Confirmation
Collaboration		
Refocusing		

Table 1

Models incorporating technology

Teacher's Stages of Instructional Evolution Using Technology (Dwyer et al., 1991)	Stages of Learning/Adoption of the Internet and WWW (Sherry et al., 2000)	Stages for Learning to Use Technology (Russell, 1996)
Entry	Teacher as Learner	Awareness
Adoption	Teacher as Adopter	Learning the Process
Adaptation	Teacher as Reaffirmer or Rejecter	Understanding/applying the process
Appropriation	Teacher as Leader	Familiarity and confidence
Invention		Adaptation to other contexts
		Creative application to new contexts

Table 2

Analyzing the similarities of these stages will help us to understand the personal and professional changes that a faculty member will probably encounter as they use technology, particularly distance technologies. The developmental progress of any one faculty member may follow one of these models or a combination of several models. It is important to understand the progression, and to realize how the various stages or levels can and should be effectively supported in order to increase the number of faculty that will successfully embrace and use various technologies for instruction

Looking at the models listed above we observe that there is a developmental process for obtaining knowledge, skills, and experiences about an innovation, technology in this case. First, the faculty member should become **aware** of the uses and benefits of the technology through demonstrations, discussions, observations (i.e. actual distance courses) and even some hands-on sampling. These continued activities should lead to buy-in and acceptance as deemed important or valuable for them, personally and professionally. The second step should involve in-depth **learning** about how to use and integrate the technology, and what specific teaching strategies can best complement specific technologies. This step should consist of varied professional development activities, including workshops for small groups, mentoring by colleagues, assistance from technology facilitators (support staff) and/or students, and A/V resources. The third step should consist of continued practice and assistance with using various technologies, in order to gain confidence, realize success and benefits, and subsequently **adopt** the innovation. This stage should encourage faculty to start integrating some technologies into their traditional courses. The fourth step should reflect significant **involvement and implementation** through more significant integration of technologies into their traditional courses and/or developing and teaching courses predominantly using distance technologies. The fifth step should involve more regular use of various technologies, that will lead to further **empowerment** through creativity, experimentation, and application, which enhances the process or outcomes of other instructional activities. The last step should reflect continued growth and empowerment, along with participation in **leadership** activities which include beneficial mentoring and collaboration. It is important to note that faculty will have the opportunity to experience growth as they move through all of these steps, if appropriate support is provided.

Recommended Strategies to Support Developmental Stages

Support for innovations has been defined in many different ways (Havelock & Zotolow, 1995). Regarding the innovation being discussed, technology, it may involve access and/or amount and/or quality of the hardware, software, staff, other equipment, connectivity services, design/development services, technical assistance, training, mentorship, support groups, community involvement, cultural acceptance, and incentives, as examples. Recognizing the need and purpose for these support components is important. However, it is more important to see how and when these components will be needed and used. An entire infrastructure should be built which identifies policies, procedures, working relationships, and provides continual support for using technologies, specifically distance technologies, effectively and efficiently. This framework for success can be accomplished through effective planning, development, implementation, and evaluation.

When developing short-term and long-term plans, an institution should utilize appropriate individuals who can act as leaders and/or facilitators (support staff) with specific roles and responsibilities. They would insure that the following general needs would be handled effectively and efficiently: 1) Developing supportive organizational arrangements; 2) Training; 3) Consultation and reinforcement; 4) Monitoring; 5) External communications; 6) Dissemination (Hord et al., 1987). There are many strategies that could be listed under each of the categories above. Having reviewing diverse research and some practitioner experiences at some universities, the following support strategies are presented, which can lead to effectively supporting faculty as they move through various stages. These strategies pertain to many types of technologies, including distance technologies.

Institutional Leaders should :

- Develop a shared (with faculty) vision, mission, and expectations about the role of technology.
- Take opportunities (one-on-one, small group, large group gatherings) to discuss with faculty the benefits (and challenges) of using technologies in their traditional courses or fully distance courses, and to encourage them to do so.

- Take opportunities (small group and large group gatherings) to ask facilitators and/or faculty to model or demonstrate effective uses of technology used in their current courses.
- Provide faculty the time (for practice and mastery) and resources (including staff) to develop and implement distance components or entire distance delivered courses.
- Provide faculty technical assistance (staff, and/or students) and convenient access to technologies.
- Provide faculty the incentives and compensation to develop distance components or entire distance delivered courses.
- Recognize, encourage and reward accomplishments of faculty using technology.
- Establish policies and procedures in conjunction with faculty and facilitators.
- Form an ongoing Faculty/Administration Committee for planning, implementation and evaluation. This includes an action plan of Distance Education activities.
- Require facilitators and/or faculty to conduct initial and ongoing needs assessments in order to identify necessary resources, and other forms of support.
- Require facilitators and/or faculty to schedule and conduct technology training for faculty. This should be developmental, beginning with the basics of using specific technologies, and advancing to the use of teaching strategies that complement various distance technologies.
- Require facilitators and/or experienced faculty to provide mentoring for faculty.
- Require facilitators to provide faculty assistance for the design, development, and implementation of courses or course components, utilizing distance technologies.
- Require facilitators to follow-up with faculty regarding their status - progress and challenges.
- Encourage mentoring/coaching and collaborative work among faculty.
- Require facilitators and/or faculty to evaluate and update courses.
- Provide faculty and/or facilitators opportunities to discover and recommend new technologies.
- Become an active participant (with faculty) in all professional development activities.

Faculty should:

- Be flexible and willing to accept new roles and responsibilities which include: facilitator, assessor, resource broker, mediator of learning, designer, and coach (Loucks-Horsley, 1996).
- Recognize technological challenges while developing positive attitudes about using technology for teaching and learning.
- Model/demonstrate the use of technology for other faculty.
- Provide workshops for small groups of faculty members.
- Mentor and coach other faculty.
- Share successes using technology, including student projects and accomplishments.
- Participate in support groups of faculty using technology.
- Reflect on instructional activities and make improvements.
- Communicate technological needs to administrators.

Conclusion

Faculty should consider using distance technologies for two reasons: to improve the teaching and learning that takes place in their current courses; and to accommodate the personal and professional schedules of current or prospective students. The provision for appropriate faculty development, which recognizes stages or levels of guided growth, is the key to ensuring faculty acceptance, adoption, and use of distance technologies. However, it is important to recognize that professional development occurs on an ongoing basis, and that it is considered to be part of the Implementation Process. In fact, the change process that institutions and faculty must confront usually involve the stages of Initiation, Implementation, Continuation, and Outcomes (Fullan, & Stiegelbauer 1991). It is also important to keep in mind two statements from Hall and Hord (1987)

- Change is a process, not an event, and it takes time to institute change.
- Individuals must be the focus, if change is to be facilitated, and institutions will not change until their members change.

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Networks as Professional Development: The Case of the Andalucian Network of Trainers

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Abstract: This paper informs on the creation and development of the Andalusian Network of Trainers in Spain. The Network serves like support structure to professionals of the formation that develop their activity in Andalusia. The Network helps the trainers in its own profesional development. It favors the innovation on themes thought and developed by the own trainers. The participants are professional of the vocational education field in working contexts little ruled and dispersed geographically.

Introduction

The traditional practices of teachers professional development are at the moment in crisis. Clark (1999) referred recently to that the professional development just as it is conceived at the present time it suffers of a series of problems: Lack of appropriation on the part of the teachers of the training programs designed from outside of the professional community; training Programs based in a deficit model according to which the formation goes to" to fix" operation deficiencies, and not to promote a professional development; short term, limited thought and without vision of professional trajectory; a de-contextualized training and without answer options to the real demands; a training in that the teachers adopt a passive paper, and lastly a training more centered in the individual demands of the teachers than in the learnings that the students should carry out

Research on teacher learning has found some results that they it plows of interest to keep them in mind to plan the teacher professional development. Next we synthesize some results that they have served as base for the creation of the Andalusian Network of Trainers.

The knowledge and the beliefs are built

We have verified so much for the developed investigations as for the practical experience that the teachers, the same as other people guide their behavior starting from the knowledge and beliefs that possess. And this knowledge and beliefs begins to build a lot before the student teacher decides to be devoted professionally to the teaching. These knowledge and beliefs that the student teachers bring get when they begin their initial teacher training they affect from a direct way to the interpretation and valuation that the teachers make of the experiences of the Teacher Education Program. By the light of this statement, Putnam and Borko they end up affirming that "for pre-service teacher education, this means attending seriously to the knowledge, beliefs, and expectations that prospective teachers bring to their teacher education programs, acquired through their own experiences in schools" (p. 1236).

The knowledge is built in social interaction

One has come understanding that the training and the teacher's learning can take place, I eat up to now we have commented, in a relatively autonomous and personal way. But little by little it has gone winning land the theories that understand learning like a process that it not happens in an isolated way but inside a social space. This way, to learn how to teach should not only understand each other as an isolated phenomenon, but basically like an experience that happens in interaction with a context or atmosphere with the one that the person interacts. It is the thesis of the sociocultural focus of the learning that establishes that the individual's cognitive activity cannot be studied without keeping in mind the relational, social and cultural contexts in that it is carried out (Wertsch, 1991). This idea has been assumed by Yinger (1991) who intends to use the concept" working knowledge", to make see that the knowledge takes place in different situations. This author speaks that "we are beginning to see that the focuses and the conceptions change from the individual thing to the cooperative and community, of being centered in the information to make it in the action, from mechanics to organic, from the measuring to the narrative, from the abstraction to the concretion, from the operations to the conversations" (Yinger, 1991, p.5).

It is of great interest and projection this focus, since it shows that the unit of analysis of the process of learning how to teach is the processes of social interaction, getting the attention to the conversational analysis, so the conversation is considered the natural context in which the cognitive abilities of the fellows become stocks and they are built around the social interaction (Schubauer-Leoni and Grossen, 1993). This way, the social groups believe what one has come in calling" discursive communities" that share forms of thinking and of communicating. Communities that establish nets and that they are good to share, to exchange, to be located in the world, to receive support, etc. (Lieberman and Grolnick, 1998).

The knowledge has a situated character

Completing the previous idea, one has come advancing in understanding that the knowledge in general and the pedagogic one in particular cannot be understood to the margin of the context in which arises and to the one that is applied. McLellan (1996) affirms that the pattern of situated knowledge is based on the principle that the knowledge is located, and it is influenced fundamentally by the activity, the context and the culture in which is used (1996). It doesn't fit, therefore, to differ in a radical way the knowledge that is acquired and the context in which that knowledge is used: the knowledge on the teaching cannot memorize in independent way of the situations in those that this is used (Marx, 1998).

The knowledge is distributed

A last characteristic of the knowledge that characterizes learning how to teach, is that it doesn't reside in a single person, but rather it is distributed, among individuals, groups and symbolic and physical atmospheres (Putnam and Borko, 1997). The idea is assumed that for the development of complex tasks, and to learn how to teach evidently is it, no person possesses the entirety of knowledge and abilities in an individual way. To admit this principle takes us to understand that it is the team work what drives to a better use of the knowledge, what takes to improve the capacity of resolution of problems. The idea of the distributed knowledge has been impelled by the impact of the New Technologies, mainly Internet. The possibility that the teachers can consent geographically to knowledge and personal contacts with distant teachers, the possibility of ownership to "virtual communities" it is enlarging the possibilities of what understands each other to learn how to teach.

Networks as Professional Development

Professional Development of Trainers has traditionally allowed scope for learning between peers. Increasingly, claims have been for a training that is participatory, democratic, horizontal, and professional for teachers. In Spain, permanent seminars or work groups of teachers have been established that consider training to be a process in which the "what", the "how", and hen" of training are decided by those involved (Estebaranz, Mingorance and Marcelo, 1999).

The term network is defined as a mesh of persons connected by links around which things flow. These can be objects, work, feelings, evaluation, knowledge, prescriptions, influence and power, interconnecting most of the participants. Networks use a variety of formulas to link different people having different purposes. Various definitions of what is a network have been made. Miles (1977) defined it as "a set of nodes or points connected by lines or links. There is often the implication that various things (such as messages, objects, energy, etc.) travel along the lines, which thus serve as a channel... In social networks, the nodes are persons, groups, or organizations. The things that travel between the nodes are *socially* relevant... objects, labour, affect, evaluation, knowledge, prescription/opinion, influence and power. So, a network is a connected set of social actors exchanging socially relevant materials" (Ref. in Clark, 1988:34). Lieberman and Grolnick consider that "networks are a way of engaging school-based educators in directing their learning; allowing them to sidestep the limitations of their institutional roles, hierarchies, and geographic localization; and encouraging them to work together with many different kind of people. Participants have opportunities to grow and develop in a professional community that focuses on their own development, providing ways of learning more in keeping with their lived professional lives" (1996:8-9).

Networks are configuring a way different from relationship among the professionals. As Hargreaves affirms "in this postmodern world, many forms of knowledge are emerging as a worthwhile and legitimate in ways that challenge the epistemological superiority of the academic establishment. Strong school cultures and vibrant professional development networks create conditions where teachers can share their own practical knowledge from elsewhere" (Hargreaves, 1996,p. 119).

The bloom of the nets among professors has a lot to do with the aversion of the teachers toward the traditional activities of professional development. The popularity of the nets suggests that the teachers and trainers move away from the conventional activities of training - or they only attend them when they are required - not due to a lack of interest in the professional development but because the format of the training doesn't respond to their necessities (Lieberman and McLaughlin, 1996). But the Networks will only represent an alternative space to the traditional professional development if they promote the learning and the reflection about the daily experience. Day recently said it with the biggest clarity "by definition, networks are also a recognition that learning only from experience will limit development, and that teachers are likely to commit themselves to learning in which they have a stake and which holds personal significance for them" (Day, 1999, p. 177).

Networks have the following features. They are voluntary initiatives, democratic in origin and working, strongly committed to innovation, change and improvement. They share aims and purpose. They are formed by trainers having common characteristics (the material and type of student taught, and the type of school in which they teach). They combine cognitive, social, and emotional learning. They incorporate everyone in active participation at different levels of involvement, with a trust in principles where one can learn from others. They are open, without restriction of participation. They entail full liberty of decision on work content, working method, time, place and frequency of meetings. They create a community that discusses and learns. Leadership is shared among the various members of the network. Through differentiated consultation, the network can seek support from a wide variety of professionals.

The Andalusian Network of Trainers

In this paper we present an example of a Network that we have been developing in Andalusia (Spain) since 1997. The professionals taking part in the Andalucian Network of Trainers (RAPF) are trainers in "Vocational Training". Vocational training refers to the training that Andalucian Government offers to people that are unemployed. It pursues a formation for the employment. It is a public and free training mostly paid by funds of the European Union. The Andalusian Network of Trainers is characterized by the following features:

- Symmetry in relationships: the relationship between members of the RAPF is based on equality. They are professionals having the same status, without differences of position or power. Such condition of equality among colleagues who share and analyse the same problems determines their interaction.
- Collaboration: the aim of the RAPF is not prescriptive. Work is based on a cycle of collaborative problem-solving and agreement. Activity is not assigned from above – the members of the RAPF, via a work procedure based on different collaborative strategies, pact with management the aims, procedure, and strategies they consider appropriate and possible in accord with their situation and interests.
- The practical, committed nature and orientation of the process: the various groups of the RAPF deal with practical business and problems.
- Recognition of the knowledge held by the training professionals: the groups of the RAPF are based more on the experience and practical knowledge of their members than on scientific-technical knowledge gained in traditional training sessions.
- Immediate support in time and space: the RAPF provides closeness of service to the various constituent groups.

The trainers who take part in the RAPF have attained a certain professional level, and can

- Diagnose contextual problems: of organization, management, planning and design of training support material, etc.,
- Recognize their own deficiencies by observation and analysis of the existing social and professional context,
- Identify and find solutions to the deficiencies and problems detected, at both contextual and individual levels,

and are

- Professionals with a certain training and prior experience in the field of continuous occupational training, and/or that of adults,
- Professionals with continuing prospects, and thus with a certain level of professional stability,
- Professionals with a defined field of activity and with certain resources, such as those of learning to learn, or Internet access.

Currently, projects are set up in response to particular problems of RAPF members, rather than as solutions on offer to other groups. Furthermore, they are

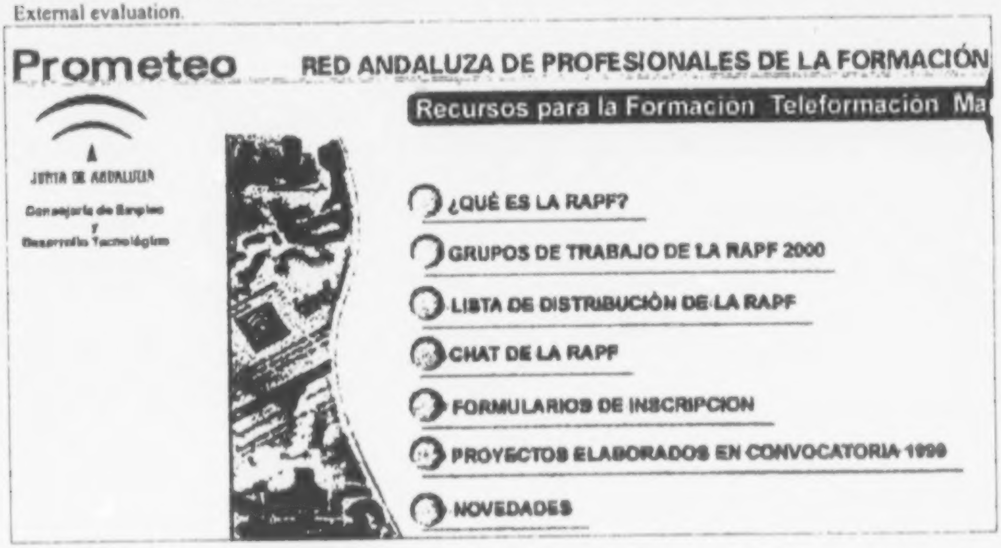
- applicable to the reality of Vocational Training,
- transferable to other professional contexts,
- of high training content for the participants.

The bedrock of the RAPF is group work as an effective formula for self-training, based on the interchange of information and experiences among colleagues of the same and/or different groups, on the reading of the bibliography related with the topics of the various projects, and on the use of new resources, such as Internet, in the search for references of interest.

Each project consists of a different topic, but they have common features:

- The creation of a web page (http://prometeo.cica.es/RAPF) for each work group: the project managers offer the groups an ftp account for uploading all the information available as work progresses. This aspect is vital, in that it is an attempt to make the groups conscious of the importance of disseminating their advances during the project, and not only at its end.
- Support, and technical and methodological consultation, for each project from RAPF managers.

- Consultation and support on the use and learning of different software for the development of group work (support in the editing of web pages, instruction in ftp applications, instruction in and management of e-mail, etc.).
- Consultation on processes of innovation.
- External evaluation.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GRUPOS DE TRABAJO DE LA RAPF 2000
LISTA DE DISTRIBUCIÓN DE LA RAPF
CHAT DE LA RAPF
FORMULARIOS DE INSCRIPCION
PROYECTOS ELABORADOS EN CONVOCATORIA 1999
NOVEDADES

The asynchronous communication in the RAPF is, perhaps, the most remarkable thing in the project's history. The two resources currently available in the RAPF (the distribution list and the web page) are very highly valued by the members. Firstly, *the distribution list of the RAPF* (**rapf@ls.cica.es**) was used to create work groups with common interests. During the month before the RAPF officially began, a considerable amount of mail was received applying to form work groups. The list was also used in the resolution of doubts, requests for information, and the interchange of opinions about the various topics dealt with in the project. Secondly, *the group web pages* are a powerful resource used by the established work groups, many being of high quality (in content and design). The web page managers are available for consultation and teaching (when required) when groups are interested in incorporating this feature into their work.

The topics dealt with by the twelve work groups are

- INTERPROF: an up-to-date electronic library of complementary information for instructors.
- Guide for the management and co-ordination of socio-employment programmes in the context of Occupational Professional Training.
- Current situation of employment advice modules in Occupational Professional Training: analysis and proposals for the future.
- Strategies for the introduction of new technologies (hardware and software) in training.
- Diversification of employment advice modules.
- New employment patterns and the detection of training needs.
- Design and validation of a model to predict the effectiveness of occupational training for subjects without work experience.
- Tele-training and working from home. Analyzing the implications of employability.
- Tele-training: resources and media.
- Certification of training companies.
- Ideas and information to get me onto the employment market.

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- Creation of an integrated module for the training of entrepreneurs.

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Managing On-Line Courses Around the World

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Abstract This article discusses the experiences of university faculty in teaching on-line courses that involve both USA and another country's (primarily third world) participation over a five-month period. Based on those experiences, and the fact that the type and manner of assistance given by the home university can be crucial to a successful program, suggestions and tips are given for faculty and technology support systems who may be contemplating teaching globally.

Global Learning

Global institutions, virtual classrooms, the race for international connectivity are all efforts to assist in maintaining a global environment where students of every age, learn about and from people of diverse backgrounds. Being exposed to people of different languages, religions and cultures create an understanding critical to maintaining and expanding our own appreciation of diversity. America's leadership in this area depends on how well we use technologies to bring a unique bonding between countries. A bonding that will bring new ideas and cultural richness to our universities and to our communities. Gaining popularity in many countries is the use of Web-based or On Line Learning. It is, for many universities, the way of the future; and with so many programs available, teaching across the continents appears to be a simple solution for bringing a sharing of cultural richness to life.

Although many university/college personnel have traveled extensively, there are additional conditions to check when courses are simultaneously delivered in The United States from foreign countries – particularly Third World Nations. Some possible barriers and concerns besides time zones include accessibility to Internet hookup. This is more of a hassle when the instructor is planning on living outside a university or business setting. Apartments, while having phone service, may not have the proper plugs, or the phones may be permanently attached without the ability to remove or plug in essential parts.

Depending upon the length of stay, we would suggest that the following questions be answered by a responsible person before leaving:

- Can I set up my computer in my flat/ dorm room or house, and how secure are the lines?
- What programs and versions of those programs I am using are being used in the visiting country?
- What assistance is there for technical problems?
- What national companies do business in the country and where are they located?
- What ISP is used – to what extent and where is contact for information on this provider?

Once the instructor feels secure about Internet hookup, there are often many bits and pieces to check. For example, in 1996, the primary author taught in the former Soviet Union for six months. She was not, at that time, teaching online, however, it was necessary to check email and to keep up with events at her home institution. The Herzen University in St. Petersburg had limited access to the Internet, and the one computer for possible use was located in the Dean's personal office. There was a choice of two providers so that part was easy and fortunately the company was not far from the flat. The cost was rather high that year, but with inflation of the Russian Ruble, it is more today. Many United States' professors work on-line and have continuous access to the Internet from our offices; however, continuing this practice in another country is not cost effective and rates become even higher. Before leaving for Russia, a magazine article discussing items needed to use existing phones plugs proved most valuable for the future. Two plugs were ordered before leaving the USA and attaching them was relatively simple, she did; however, have to purchase a new phone to use the plug.

More recently, the author had the opportunity to work in Mumbai, India for five months. This time, she was charged with teaching two regular classes at her home university from India – entirely through a web-based program. She thought she was fully prepared. A new laptop with CD and lots of memory, a university that had a small computer lab, and the knowledge that she could hook up to an ISP from her hotel room at the international YWCA gave her the confidence to proceed.

First Crisis

The first crisis was not from Indian students, but rather from students in the States who were anxious about the professor they had never seen. Before leaving she burned a CD with six guest speakers and left packets of resource materials. Students bought the CD with their textbooks. She also made sure that a former graduate student was willing to work on-line at home to put out fires. Second crisis: how does one grade papers sent in the web-based course when on-line time may be limited or spotty yet is necessary to read entries? The solution, after a couple of agonizing weeks, was to have the students send their papers for grading on regular email. That way papers could be copied into a word processing program, corrected off-line and uploaded into regular email.

The concept of working with other institutions and using global Internet access is a valuable one to be nurtured for future courses and relationships. We are just beginning to see that the possibilities are limitless, but we haven't thought out the barriers and ways to deal with them. Several mistakes were found in our thinking and manner of delivery of courses. While the mistakes appear minimal, they are, never the less, solvable mistakes; and we cannot take for granted that they will not appear the next time we visit a foreign country.

The mistakes

- Third world countries do not always have the latest versions or compatible software.
- Computer labs are not always accessible.
- People work at slower paces in some countries, and getting things done when you want them done may be next to impossible.
- The new cyber cafes may work, but lines form after 9:00 A.M. and continue into the evening. Others stand and stare at you until you decide that reading five out of 15 messages will do for the day. Patience is a virtue.
- Moving to a guesthouse is also not the answer. Reason: other guest may want to use the phone and there is only one line.

Suggestions and Tips

The following check list of needed equipment and suggestions in order to experience web-based learning with a minimum hassle may be useful.

- Laptop with enough hard drive and memory. A CD drive is added benefit.
- Cell phone with Internet capabilities (May be necessary for laptop hookup without disturbing existing lines).
- Telephone plugs indigenous to a particular country
- Back up for programs on Zip Disks
- Zip Disks and/or regular formatted disks brought from your own country (due to possibility of viruses).
- Portable Zip Drive

These are the immediate barriers, concerns and solutions for on-line teaching from foreign countries. There may be more extensive concerns in the future, or when one is going to countries other than those mentioned. The idea of using CUSEEME or like technologies may be possible, however, not all countries have satellite or phone capabilities. This is especially true in the remote rural areas.

In addition, the use of multi-media is not usually common in most areas due to cost of supplies, equipment such as overhead projectors or LCD Panels. It is highly recommended that you carry your own, if possible. One person traveling alone makes this difficult. The faculty member brought finished transparencies; plenty of formatted disks, a laptop, and portable zip drive. Although light in weight restrictions, these items became a burden as carry-on luggage. Since we weren't sure about security x-ray and whether or not the disks would be damaged, we wrapped them in foil and placed them in an easy access folder for hand checking. Sending pictures and files home was the easy part. A graduate assistant downloaded to a zip disk so there was a secure feeling on the return home. All in all, the experience can be positive with just a little forethought, planning and assistance from your home university or business.

Online Group Processing: A Qualitative Study

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Abstract: A qualitative analysis of two online groups, which occurred as part of course requirements lasting fifteen weeks, developed functional communication categories, concepts, and constructs. Examination of two student nurse groups indicated differences in student ability to use cyberspace for group decision-making. Students adapted familiar communication strategies and invented new ones to complete an action research project. The characteristics identified in this descriptive study indicate some major differences between face-to-face and online decision making groups.

A three phase research study of online asynchronous group processing conducted at Brigham Young University College of Nursing seeks to identify the elements of online communication that affect instructional design. Little fundamental research describes the development of online group norms. It may be that the asynchronous, e-mail based, problem-solving groups process decisions so differently from face-to-face groups that new definitions and process descriptions are needed. How do the unknown timing, transitions, and functions affect problem solving? A better understanding of the group process will promote adequate facilitator use, and accurate evaluations of individual and group participation (Cartwright, 2000; Diekelmann, Schulte, 2000).

Methodology

Strauss and Corbin's (Strauss, & Corbin, 1998) methods of qualitative research guided the methodology as recommended by Fisher and Hawes (1970) for the development of small group decision-making theory. The descriptive study consists of the construct, concept, and theme analysis of two sophomore student nursing groups using listserv based (automated electronic mail by subscription) discussion groups. The data sources used were demographic surveys of all participants, interviews with five participants about their experience, and electronic mail documents. Analysis of data sources concentrated on the functions, roles, relationships, transitions and timing of functions. The two groups judged by three facilitators as producing the most and least effective outcome products (research papers) were selected for initial analysis. The author chose these groups based on the assumption that most identifiable concepts would be found within the scope of the two outlying groups. Analysis of all groups thereafter verified the assumptions.

Sample

Forty-eight students, divided into six equal groups, completed a required "family project". Pairs of students visited chronically ill patients weekly. The fifteen-week project required students to communicate electronically three times a week to define the role of a "family coach" for families. Students studied the issue individually and wrote a group paper online as the product of their participatory action research. Students received letters requesting their consent and describing the research.

Analysis

Data used in phase one consisted of e-mail documents, a demographic survey, and transcribed interviews. An overview of the documents developed constructs and concepts of what was said and done in each group. All documents were then analyzed for common elements and collapsed into categories. The researcher and assistants checked coding and tallying of documents. The functions, roles, relationships, and transitions were linked to the time of occurrence. Participants completed the survey of computer use, group experience, and family nursing during the first week of the project. Interviews of five participants during and after the project sought to verify observations. Electronic mail documents were coded by sentence for function constructs.

Findings

Differences in performance were expected between the two groups studied as the facilitators had judged the groups as producing the least and most effective outcome papers. The first differences noted were the number and size of communications sent. Group one produced the least effective paper and sent 215 messages containing 420 kilobytes of information. Group two produced the most effective paper and sent 446 messages containing 1265 kilobytes of data. The facilitators sent 13 messages to group one and 35 messages to group two.

Students were females between the ages of 19 and 24 years in their first nursing class. None of them had been in a hospital setting and were not familiar with teamwork in an academic setting. Students stated they had used electronic mail between 5 and 20 times in their lives. Students reported the family project as their first experience with online learning and automated e-mail.

A five point Likert like scale measured (1=none/poor to 5=severe/excellent) perceived abilities and anxieties. Students rated their abilities to use e-mail as good and their anxiety to working on the computer for the assignment as mild. Students rated their electronic discussion group abilities as poor. Participants judged their group work anxiety levels between mild and moderate. Students were more nervous about working with families in the home setting with the average score of 2.8.

Categories and Definitions

Concept definitions and category groupings described the functional purpose of communication. Students faced three main challenges during the online decision making process: completing the task, developing and maintaining relationships, and communicating via a new technology.

The task-oriented category was the most frequently used category, while the online communication category identified the most differences between face-to-face and online group processing.

Task Oriented Category: Unlike some face-to-face studies of the past (Tuckman, 1977) where relationship maintenance was the most frequently used function, online participants spent most of their communication time on the task. Critical thinking and methods of working on the task were analyzed.

The questioning concept consisted of task and process questions and the requesting information in a statement format. For instance, "Tell me what you think" requests information in a declaration. The creative concept described the development of new thoughts and knowledge. Students most frequently used personal opinion rather than literature, teachers, and local agencies as the authoritative voice. Students tried to eliminate the number of steps in reaching consensus by making declarations that sounded like conclusions and then asking the group for validation. This eliminated a number of steps in reaching consensus. Students ignored debate strategies in favor of idea development.

Relationship Process Category: Relationship process coding identified two concept functions: development/maintenance and leadership. The softening statement construct was defined as an attempt to avoid conflict by offering remark after a strong "stinging" statement that might elicit a negative response; "…but that is just my opinion, feel free to disagree…" The most frequently used concept was validation of individuals and the group. Validation was defined as encouragement, empathy, and individual attention.

Online Communication Category: The online communication category focused on the student's use of e-mail and message construction. The study looked at how students used the subject line and reply functions, which are characteristics of the e-mail medium. Participants adapted greetings and conclusions to overcome the lack of visual cues. Students applied two other constructs to ease communication. 1) Organization elements structured the message of clarity and indicated changes in the discussion. 2) The place statement provided orientation to time, place and circumstance. Place statements indicated the situational conditions of the speaker (sender) and provided a shared understanding of where the participant began or ended a thought. The construct usually consisted of one sentence in the first or last three sentences of the message, but could constitute a small paragraph.

Use of Concepts over time: Working relationships styles seemed to form immediately with little variance until the outcome deadline approached. Stress appeared at transition points. Individuals transitioned from introductions to content production and then to solution production at different times. When upset individuals received messages that resolved their issues, the distress resolved. These findings support the work of Connie Gersick (1988, 1990) and others working on group norms (Hackman, 1990)

Discussion

Differences found between how online and face-to-face groups function could affect instructional designing. Students invented new methods of problem-solving, conflict avoidance, and idea sharing.

Task/Solution: Questioning became a strategy to avoid conflict, show openness to new ideas, request help, and explore issues. Students combined statements with requests for validation and social support. "That is my idea. What do you think?" This strategy seemed to serve for body language that conveys a willingness to listen to new ideas.

Telecommunications may deliver fast messages but cannot guarantee when the reader will read the message and reply to it. The abbreviated discussion strategy required individuals to process their ideas before placing them online. Participants presented ideas with thesis and supporting statements. Others replied with supporting opinions and amendments to the idea. No dissenting arguments were noted. When three or more supporting messages were received the group adopted the idea. The democratic abbreviated discussion style avoided conflict and promoted thorough processing of ideas before presentation. Non-supported ideas were ignored rather than debated. Students spent time and content on the majority-supported viewpoint supported. This discussion strategy required readers to read between the lines. Students side stepped the idea fine-tuning and details normally present in face-to-face communications.

Relationship Process: Students used validation more frequently than the other process constructs. Validation encouraged, comforted, praised individuals and promoted group identity. The most successful group included validation in 90% of their messages.

Online Communication Category: The online communication category produced the most differences between online and face-to-face groups. The written nature of the conversation required each contribution to begin with a name or social statement and to restart a discussion with each message instead of the flowing from one idea to the next as in face-to-face groups. Greetings served the same function as raising one's hand. Students knew each message carried a heading in the subject line but most often communicated a change in speaker within the first sentences of the message. The message opening indicated turn taking with informal group greetings like, "Hi, guys", and "Hey

Time passage from sending to receiving broke into the conversations. Readers worked hard to remember the conversation thread and formulate replies. Some participants worked to overcome feelings of disjointedness by avoiding greetings and use of the subject line. The use of a greeting and a conclusion emphasize time and distance. The absence of greetings and conclusions also occurred when the participant appeared hurried or felt strongly about the content.

The subject line was used more often than not. The subject line served several purposes but rarely acted as a "thread" (commonly used subject index). The following functions appeared in the subject line: Announcement-"deadline", group organization-"now", place statement-"today is a good day", validation-"great work", priority notice -"important", direction-"read this", greeting-"hi", and apology- "oops".

The place statement attempted to create a shared environment, act like body language, warm the environment and ground the group in a common understanding. A major difference between the findings of this study and group processing literature was the frequency of conflict. The two groups avoided conflict completely. The difference may be due to the sample of nursing students and not the technology as Tuckman found nursing students avoided conflict in face-to-face groups (1977).

Some students expressed problems with using technology for group work. Difficulties mentioned were: reaching a timely consensus, lack of non-verbal cues, delays in response time, remembering what each group member said and remembering the feelings that accompanied the messages. The lack of people in the same room contributed to a "light" feeling or lack of importance to the task solution process. Other students struggled with the weight of emotions as time passed. Immediate clarification and elaboration defuses many misunderstandings in face-to-face groups. New strategies must serve similar purposes in the online environment.

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Innovative Teacher Education Using the Web-based Integrated Science Environment (WISE)

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Abstract: We present the design, testing, and implementation of a professional development model that uses three essential components: a successful Web-based curriculum environment (the Web-based Integrated Science Environment: WISE); a virtual community of teachers and scientists who discuss pedagogy, collaborate on curriculum design, and offer continuing support for in-service members; and virtual mentoring between new community members and veterans. The Web-based Integrated Science Environment (WISE) builds on the successes of a decade's research on the Computer as Learning Partner project. In this professional development project, we sought to combine solid pedagogy that was the result of extensive funding by the National Science Foundation, with large-scale professional development in a large teacher training institution.

Introduction

The Internet can offer new avenues to effective instruction, where students perform inquiry-based or design activities in current science topics. The challenges of incorporating these new technologies and pedagogical approaches are frequently beyond the scope of current professional development programs. It has been argued that without sufficient professional development support, the Internet will fail to fulfill the promise of supporting improved teaching (Wiesenmayer & Meadows, 1997).

The Web-based Integrated Science Environment (WISE) is a scaffolded Internet-based platform for middle and high school science activities (Slotta & Linn, 2000). These activities are designed according to the Scaffolded Knowledge Integration (Linn & Songer, 1991; Linn, 1992) theoretical framework which emerged from a decade's research in the Computer as Learning Partner (CLP) Project (Linn & Songer, 1991). In a WISE activity, students work collaboratively to utilize Web evidence during self directed, scaffolded, scientific inquiry. In one activity, students consider differing approaches to stopping the spread of malaria. In another, students compare two theories concerning the appearance of deformed frogs in American waterways.

Students navigate through activity steps in the left-hand frame of a web browser, and utilize Web Evidence in the right-hand frame. In a WISE activity, students work collaboratively to explore Web "evidence" relating to critique, comparison, or design tasks. Figure 1 shows the WISE software interface in the Deformed Frogs activity. WISE provides science teachers with a versatile technology for bringing pedagogically sound Internet-based activities into their curricula, promoting the development of integrated understanding and lifelong learning skills.

Even when presented with a tool like WISE, however, teachers require significant levels of support to adopt new pedagogical concepts and methods. For example, teachers need to understand that technology is not an end in itself, and that the Internet must be used carefully to promote constructivist learning. Also, despite great advances in the understanding of students' preconceptions and despite great advances in pedagogy that addresses how to teach to assist students' conceptual change (see Linn, 1992, Clement, 1993, Slotta and Chi, 1997, Peterson & Treagust, 1995), the majority of middle school and high school science teachers still employ more traditional approaches to teaching science. (Poole and Page, 1995) Thus, teacher professional development emerged as an essential component of the WISE Project. In order to support teachers with powerful new technology, we must help them gain new understandings about effective curriculum activities. Our WISE technology must scaffold students and teachers alike.

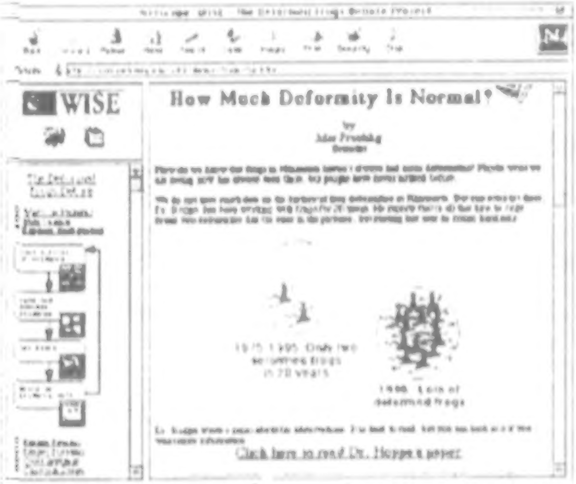
WISE
How Much Deformity Is Normal?
by
1975-1995: Only two deformed frogs in 20 years
1996: Lots of deformed frogs
Click here to read Dr. Hoppe's paper

Figure 1: The WISE Deformed Frogs activity. Students navigate through activity steps in the left-hand frame, and survey Web "evidence" in the right-hand frame.

The challenges described above provided us with the incentive and opportunity to develop and test effective approaches to professional development that can respond to teachers' needs and constraints while still fostering the development of new ideas and approaches. We designed and field-tested an on-line community to help teachers learn about the WISE pedagogy and technology, for use in their own classrooms. This community was designed to be a self sustaining professional development resource for its members. We will review the design of this community, and then describe a professional development curriculum that builds on its structure to help in-service and pre-service teachers develop powerful new understanding about science pedagogy.

Design & Testing

We designed a professional development model that uses three essential components: a successful Web-based curriculum environment (WISE); a virtual community of teachers and scientists who discuss pedagogy, collaborate on curriculum design, and offer continuing support for in-service members; and virtual mentoring between new community members and veterans.

WISE Pedagogy and Curriculum

Our first objective was to help teachers learn the pedagogical principles of Scaffolded Knowledge Integration (SKI) (Linn, 1992), and understand the WISE software and curriculum. In the WISE pedagogy, students engage in the scaffolded knowledge integration format in which

- thinking is made visible,
- social supports for learning are integrated,
- accessible goals and models are provided, and
- autonomous learning is promoted.

After our teachers became comfortable with the technology and pedagogical principles, we scaffolded them in tailoring and implementing an existing WISE activity for use in their classroom. Our goal was to develop teacher training activities based on the same SKI pedagogical principles that inspire our design of the WISE student software and curriculum.

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On-line Community of Practice

We designed an on-line community where teachers are engaged in an active discussion of issues concerning constructivist pedagogy, best practices, use of WISE and other technologies in their science classrooms, and development of effective curriculum activities (see figure 2). In our design, teachers can dialog with each other and with mentor teachers, scientists and educational researchers to help gain understanding of the WISE pedagogy, software, and curriculum. The on-line community also provides teachers with technology supports for adopting their own WISE activities, and supports teachers after they have completed the program.

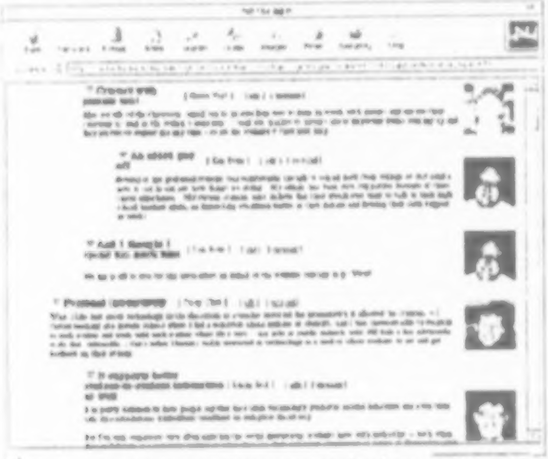

Figure 2: The on-line community electronic discussion tool, where teachers respond to one another's comments. Other tools support collaborative design.

Virtual Mentoring

Given that new teachers are greatly influenced by mentor teachers during their student-teaching and early teaching experience, a great challenge is to establish ties between new teachers and exemplary teachers. Furthermore, the amount of time that pre-service teachers are able to spend with their mentors is often very limited and comes to a definite ending. Our objective was to connect pre-service and in-service teachers with mentor teachers through a dynamic continuing virtual mentoring program as part of the on-line teacher community. Interactions would be facilitated by the on-line community, and aimed at communicating sound pedagogical approaches as well as technical expertise with WISE.

Working in Partnership to Develop the Program

Extensive development and support of the WISE environment and on-line community technology was done at the University of California, Berkeley. The environment was field tested with in-service and pre-service teachers as part of life-long learning initiatives and as part of coursework that led to the state clear teaching credential at a large university college of teacher education, California State University, San Bernardino. Our goal was to allow a significant research project (WISE) to be implemented with large numbers of pre-service and in-service teachers through an established teacher education and credentialing program. This type of partnership has the capacity to improve both the research of such environments and the implementation of critical research projects in the field with working teachers.

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A Multi-dimensional Approach

Teachers who were working on their preliminary teaching credential interacted with the WISE technology and pedagogy as part of their curriculum in a secondary science methods class. Several teachers who were working on their clear teaching credential (which must be completed by teachers before they have taught with a preliminary credential for 6 years) or who were working toward a masters degree in education were exposed to the WISE technology and pedagogy as part of a Technology for Science Educators class. Select science teachers who were working on a Masters degree in Education worked within the on-line community and developed WISE activities as part of their master's degree requirements.

In the first year, all 20 teachers in the Secondary Science Methods course at California State University, San Bernardino (CSUSB), interacted with the NetCourse and were required to implement WISE in their classrooms or observe implementation in another teacher's classroom. Teachers in this class interacted with the WISE NetCourse, and joined the on-line community. They were also introduced to the WISE project by a guest lecture by the director of the WISE project from Berkeley.

During this first year, in the winter quarter, teachers interacted with WISE for approximately 8 hours, spread over the course of a 10 week quarter. Based on post survey data, there is evidence that the NetCourse showed efficacy for training and facilitating use of the WISE curriculum. Most teachers were unable to actually implement WISE in their classrooms, due to lack of access to an Internet ready computer lab classroom. Despite this, there were notable successes by individual teachers who were able to implement the innovative WISE pedagogy in their classrooms.

During the spring quarter of the first year, seven students, enrolled in a special elective course, Technology for Science Educators, engaged in the NetCourse and studied WISE. All but one of the students engaged in the WISE NetCourse. All students could access the on-line community. All students could access on-line mentors. Based on discussions that occurred in the class and based on participant email, participants were split over the efficacy of using on-line in class discussion tools when face to face discussions could be conducted instead. Many participants were hampered by lack of access to sufficient technology to implement WISE in their school setting.

We applied lessons learned in the first year to the second year's Secondary Science Methods class. Specifically, we made participation in the WISE project optional, we reduced the size of the NetCourse, and we again brought in the director of the project who spoke about WISE during one of the class sessions. In the second year, the professor teaching the Secondary Science Methods course required all students to do a professional "risk project". Students were required to implement lessons that reflected a change in how they would ordinarily teach. In the course, the professor emphasized the utility of inquiry methods for teaching science.

We encouraged the use of WISE as part of the professional risk project, a project in which students had to implement a lesson plan (or series of lesson plans) in their classroom in a new way—a way that represented significant learning on their part—a way that meant that they were taking a risk in conducting the lessons. Our intent was to bring these teachers past their comfort zone to enable significant learning concerning teaching in an inquiry manner.

Of the 20 students in the class, seven chose to engage in a modified WISE NetCourse based on interest and access to necessary resources. Several students elected to utilize WISE in their classroom in order to satisfy the requirements of the "risk project." These students were highly motivated to find out about WISE via the modified NetCourse. In this environment, all students could access on-line community. Mentoring was done on an as-needed basis via email. Several students implemented WISE in their classrooms during the academic quarter.

Assessing Our Impact

We assessed the impact of our Professional Development Program through pre- and post assessments of teacher beliefs about pedagogy, the Internet, and specific science discipline knowledge, as well as by interviews of several participants. We assessed the impact of our virtual mentoring through interviews, as well as analysis of recorded log files of community activity.

Based on exit survey data from the last 2 years of the project, it was clear that a number of students were very enthusiastic about the potential for using WISE in their classrooms. Students commented on the utility of learning about the WISE approach to teaching and learning through the on-line community. For instance, one student stated in his exit survey, "Thank you for enlightening me on this powerful and dynamic learning medium. I look forward to continuing the use of WISE in my classroom and watching this project grow and mature." A number of students have continued their participation in the WISE community, authoring innovative new curriculum units for use by other teachers. In one case, a student from the second year of the project is working with individuals in Thailand on a unit that concerns the rain forest. In another, a student from the Technology for Science Educators class co-developed, with another CSUSB student, WISE personnel and scientists, the WISE unit on how to control malaria. Two particularly notable examples of successes reveal teachers, who interacted with the WISE project through teacher education courses, each becoming teacher of the year for their school sites.

Discussion

Important ingredients for successful use of WISE in classrooms

From our ongoing analysis, we are identifying criteria that appear to be critical to successful use of the WISE materials in classrooms:

- A positive introduction (e.g., course-related, via web, via professional development, personal contacts)
- Computer and network availability with necessary technical support
- Support for pedagogy implementation (In our project, the WISE staff provided extensive support to new teachers).

Teacher involvement is critical to success of the effort

A number of the teachers either have created or are creating new WISE units in collaboration with researchers. Additionally, a number of teachers from CSUSB courses have become WISE leaders, spreading their understanding of the WISE pedagogy and Internet materials to colleagues. These mentors spearheaded in-service workshops and conference presentations. It represents a scaffolding for a vibrant, sustainable, teacher professional development community, in which science teachers are brought together to discuss and implement significant advances in the implementation of inquiry based, technology rich science pedagogy.

Future directions

Current lack access to Internet equipped laboratories has impeded implementation of WISE in many students' classrooms. Most indicated a desire to maintain contact with WISE in the future; a number of students intend to implement WISE activities in their classroom in the near future when they have access to the internet in a computer lab. This is particularly encouraging as schools race to connect to the Internet, often without a strategy for effective use of the Internet in classrooms (for a discussion of these concerns, see Barowy & Laserna, 1997; Wiesenmayer & Meadows, 1997). Given the successes experienced through this collaboration, and consistent with the current guidelines of the California Commission on Teacher Credentialing (CTC) and the National Council for Accreditation of Teacher Education (NCATE), which advocate the integration of technology into methods courses, the WISE Professional Development program has become an integral component of California State University, San Bernardino's Secondary Science Methods class. We are continuing to provide feedback to University of California, Berkeley's WISE team, to continue to enhance research and development efforts to improve science education.

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Netseminars: A Strategy for Team-Based Action Research

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Abstract: Professional Development School (PDS) partnerships offer a powerful leverage point for the improvement of student learning in the K-12 sector and a unique opportunity to experiment with new forms of online learning for the adults who work in and with schools. In this paper we present lessons learned in the design and delivery of online courses to teacher educators, classroom teachers, support personnel, and student teachers associated with the Virtual Professional Development School Consortium. We describe the NetSeminar model that is evolving through this work, and consider strategies and implications for replication.

The Context

Professional Development School partnerships are sustained local collaborations between a teacher education program and one or more schools, seeking to improve student learning results by using action research to continuously improve both teacher preparation and professional development. A growing number of national organizations support the idea that PDS partnerships be used as a primary vehicle for expanding the quality and capacity of preservice and inservice programs to effectively prepare and continuously support the next generation of America's teachers (need source).

Professional Development School partnerships are fertile ground for online work. By definition, a PDS brings together higher education, the k12 sector, and their respective communities. Collaborative action research provides an effective context for bridging very different cultures and focusing on the shared interest of improved student learning. Among the sites that are truly striving to develop PDSness, there is a built-in readiness for experimentation. However, there are significant barriers to collaboration; among them time and distance – an obvious opportunity to employ computer mediated communication.

This was a central premise for the Virtual PDS Consortium, a US Department of Education funded Technology Innovation Challenge Grant involving 30 Professional Development Schools in nine states (need source). Begun in 1998, and coordinated by the National Institute for Community Innovation (NICI), the five-year project was conceived to help K-12 school-based teams learn together while working together to create a technology-enriched learning environment in a professional development school.

The goals of the Virtual PDS Consortium's online efforts are to facilitate communication with and among the sites and to deliver formal learning opportunities in support of PDS development and technology integration. The Challenge Grant included funding for the development of four online courses to be delivered in sequence: 1) Using Data, 2) Technology Applications, 3) Technology Planning, and 4) Professional Development Planning. The strategy underpinning this sequence was to put the initial emphasis on the examination of local K-16 data related to student learning, and to use these findings as a basis for selecting technology applications with the greatest potential to affect desired improvements. Similarly, each subsequent course is intended to build on the previous offering, leading to a high-quality professional development program for each PDS.

The online environment for the Virtual PDS Consortium is Vista Compass, a Web-based application built on the metaphor of a campus. Compass runs on a Lotus Domino platform that integrates registration, transcript and billing information, self-service applications, as well as tools to control the security, organization and customization of services. Of primary interest to NICI and the VPDSC was the flexibility to configure private space, group space, and course space in virtually limitless permutations and combinations, as well as the potential to plug in additional applications, i.e. chats, audio, streaming video.

The first online offering was called the "*Using Data Netcourse*." Some 200 participants signed up for the course. A Lead Instructor was responsible for designing the assignments and marking up the documents for presentation in the course space, pacing the course via mailing list, troubleshooting local problems through local Data Contacts, and addressing individual participant needs by way of phone and email. Eight Data Mentors served as assistant instructors; each assigned to clusters of sites. Experts in professional development were assigned as critical friends to each of the 30 PDS sites. The goal was to provide a small expert-to-participant ratio. In short, a substantial amount of resource was invested to produce and facilitate the netcourse.

The *Using Data NetCourse* was structured in a series of "sessions" following the outline of a textbook that had been selected by an advisory group. Participants were expected to reflect on the textbook readings, compare with local practice (in consultation with colleagues, if possible), report to the large group, and engage in class discussion. It operated on a schedule independent of participant's learning or productivity. In week three, for example, participants were expected to be reading Chapter 2 and commenting on Data in the Change Process. Unfortunately, we encountered a series of technical and logistical crises, so that by the third week we had lost over half of the participants. The 12-week course was extended for an extra month to accommodate the survivors.

Lessons Learned

Direct feedback from the participants and data provided by the external evaluator (through surveys and site visits) were used to draw lessons from the first course:

- Missing Participants – individuals who were not able to access the site and had no technical support to work through access issues, were lost before the course even started.
- Missing Textbooks - sites/individuals who either did not order the textbook in a timely fashion or fell victim to cumbersome requisition procedures, were operating in the dark.
- Overwhelmed Participants – those with little or no experience with web browsers, group space, or course environments felt overwhelmed by the campus and its many features. Threaded discussion was also problematic for many.

- Campus Configuration Confusion – we learned, after the fact, that participants had been registered varied permissions and services – for many the instructions did not match the tools.
- Missing Mentors & Experts – some of the mentors and many of the staff developers were also challenged by the virtual campus.
- Inundated Instructor – the sheer number of participants and the volume of technical assistance needs left little time for the instructor to attend to those who were navigating the campus well for the first three weeks of the course.
- Expectation Variation – many participants came to the course expecting to learn about data use in their respective classrooms, rather than data use targeted to school improvement. Others were frustrated by the constructivist orientation.
- Disappointing Discussion – it was difficult to get participants to comment on each other's reports and reflections. Most of the interaction was between instructors and participants.

In spite of the impediments, there were many bright spots. One site in particular served as our shining example. Interestingly, it was not the most technically advanced site; rather the star PDS was in a high-need school with very limited technology. Most of the ten participants who signed up for the course had very limited computer experience and had never worked online. To assure success in the course they agreed to work as a team. They held weekly meetings to discuss the readings and improve their skills navigating the campus. They used their online group space to plan agendas, discuss the readings, and prepare assignments. They took turns presenting their findings, conclusions, and questions to the in the course space. Their final project was a collaboratively developed data plan keyed to the school improvement plan that they co-presented to the entire school.

The Data Contact was instrumental in this success. She participated in the course, served as team leader and tech support person, and communicated regularly with the course instructor to offer feedback and clarify course expectations, and to get help with technical issues.

The success of this one team was mirrored in findings from participant surveys conducted by the outside evaluator. The strongest indicators of engagement in the course were related to local support, the degree to which they participated as a team, and the linkages to school-wide goals.

Based on these findings, we made a number of changes in the second online offering. Most importantly, we changed the name to the "Technology Applications ***NetSeminar.***" We offered a pre-course orientation with a special effort to attract participants with little or no virtual campus experience. The seminar began with a self-assessment and a round of introductions. There was no textbook; rather, sites were asked to acquire copies of ISTE standards to be used as a reference. All required readings were provided online. The online activities were designed for groups – with the initial set of assignments for school-based teams, and moving to virtual inquiry groups formed during the netseminar around the specific, individual interests of the participants.

The *Technology Applications NetSeminar* was led by a Facilitator and two Instructors. The Instructors were responsible for course content and resources, enabling the Facilitator to concentrate on the flow of week-by-week activities. The pace of the course, instead of being driven by coverage of material, was driven by a set of team-based products, which could be addressed when appropriate. At each stage of the seminar, only those documents and tools needed for the assigned work were visible to the participants.

The *Technology Applications NetSeminar* presented new challenges, mostly related to the fact that we attempted to run the seminar through the summer months. It had the effect of negating the expectation that participants from each site would work as a team. Except that the same site that had been the shining star in the first course made the extra effort to get together over the summer. Once again, informal feedback and participant surveys reinforced the importance of local support, team participation, and the linkages to school-wide goals.

To assure that all sites were prepared to engage in future courses, the third course (technology planning) was put on hold and resources were diverted to assist all PDS sites had fully-developed local action plans and technology plans.

The NetSeminar Model

Even as we proceed with the first sequence of courses, we are incorporating the learnings and retooling the courses. We have updated the Using Data NetSeminar. Figure 1 (below) represents the latest version:

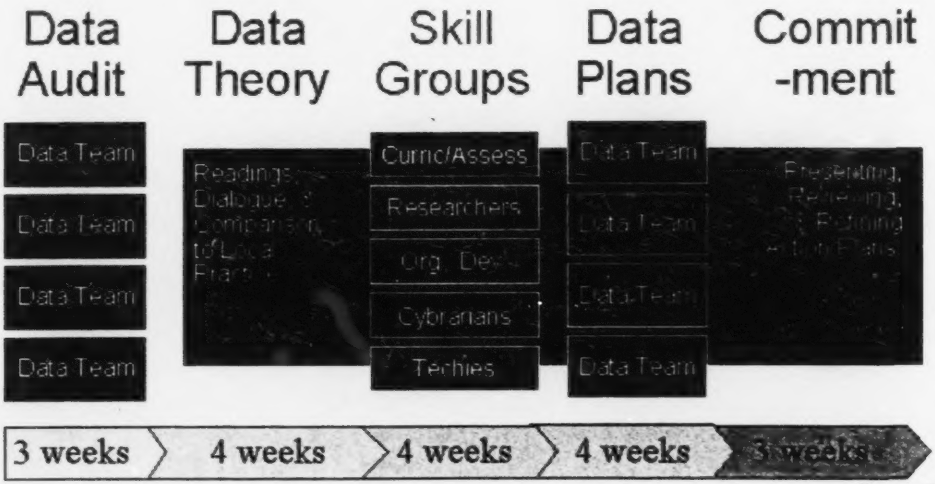
Data Audit
Data Theory
Skill Groups
Data Plans
Commit -ment
Data Team
Data Team
Data Team
Data Team
Readings, Dialogue & Comparison to Local Practice
Curric/Assess
Researchers
Org. Dev.
Cybrarians
Techies
Data Team
Data Team
Data Team
Data Team
Presenting, Reviewing, & Refining Action Plans
3 weeks
4 weeks
4 weeks
4 weeks
3 weeks

figure 1.

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Data Audit - Data Teams (a minimum of 5 members) from participating schools are provided Group Spaces to serve as home base for their work. A series of questions will be presented to assist teams in the collection of 'legacy data' related to their school improvement priorities. The data audit activities also serve as an orientation to Group Space and the Campus *(approx time frame = 3 weeks).*

Data Theory - participants download and read selected materials from the website. Instructors will lead participants to an understanding of frames for data use and strategies for measuring equity. Outcome of this work will be reflective essays comparing ideal to local practice *(approx time frame = 4 weeks).* Note: the graphic shows the large group conversation continuing in the background through phases 3 & 4, i.e. skill group and data planning are the main focus; however, there will be some reporting and comparing of experience in the large group.

Skill Groups - Participants self-select into skill groups: Curriculum & Assessment, Action Research, Organizational Developers, Cybrarians, and Techies (the reason for requiring that each Data Team will have at least 5 members). Each Skill Group will focus a set of skills/strategies that will become part of a comprehensive plan for engaging colleagues in data-driven school improvement *(approx time frame = 4 weeks).*

Data Planning - Data Teams will apply what they have learned through the audits, readings, discussions, and skill groups to develop tentative data plans. Note some teams will be developing plans from scratch - others will be developing upgrades to existing plans *(approx time frame = 4 weeks).*

Presentations & Commitments - Data Teams will "present" their data plans for review by their virtual colleagues. Data Teams will consider the feedback and develop action plans for securing local support *(approx time frame = 3 weeks).*

Strategies and Implications for Replication

The Virtual PDS represents a rich laboratory for the development of online learning. The personal and institutional commitments made to the project with the extra incentive of the outside funding produces a community willing to experiment and to tolerate errors and omissions. As long as we can sustain the partnership, we have a grace period to continue the experiment.

While we focus on the experiment, we are also mindful of a growing market, among all K-12 schools, for online delivery of learning opportunities for preservice and inservice teachers and the other adults who work in and with schools. The recruitment and retention of a quality workforce in the face of shortages is on the radar screen of ever greater numbers of policy makers across the political spectrum. Meanwhile, the accountability movement continues to gather steam - placing schools and school leaders under greater pressure to more effectively serve ever more diverse student populations and to achieve higher standards. Schools & districts are becoming more selective about professional development and demanding services that can be delivered on-site in the context of school improvement priorities.

As K-12 schools get ever closer to the goal of universal Internet access schools and teachers and other school personnel are less bound by time and distance – they will seek out online resources that best meet their professional development and school improvement needs. Increasingly, it is a buyer's market.

For both practical and pedagogical reasons, the response from higher education cannot be limited to mere translation of existing courses to make them available to schools. Stand-alone netcourses are not responsive to schools, nor can they exploit the richly integrative possibilities of Web technology. An effective response requires tools, strategies, and skills that create constructivist, problem-solving, and collaborative learning environments.

The Virtual PDS Consortium experience suggests that the "netseminar" is a responsive and effective model for meeting the emerging demand for online learning in the K-16 market. Whereas a traditional "course" is structured around a pre-determined set of concepts, knowledge, and skills delivered by an expert to the learner; the seminar format begins with the knowledge, skills, and needs that the participants bring to the group setting. In the seminar, peer-to-peer interaction is essential and central to the learning experience, while the existing knowledge base provides a framework and reference points for the conversation.

Ultimately, we believe that the netseminar is a temporary and transitional strategy that will give way to even more responsive systems. We envision a future in which each individual has access to tools and resources for a truly personalized learning plan, and the capacity to link and interact with peers, mentors, work groups, as well as vast databases and libraries. Our commitment to work with PDS partnerships is built on a belief that the most effective strategy for transforming education is to begin with the learning needs of the adults in the system.

Our experience with netseminar development is currently limited to the 30 Virtual PDS Consortium partnerships. At times progress feels painfully slow as vision and potential outstrip practice. We assume that there are many other examples of online experiments among the 500 plus PDS partnerships that presently exist. We see a great need to develop to create forums to support continuous inquiry across initiatives as a means to accelerate the constructing of new knowledge and to facilitate school transformation. We welcome invitations to partner in such efforts.

Facilitators' Perspectives on Using Electronic Communication Channels to Build and Manage Relationships with Virtual Team Members

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Abstract
The use of virtual teams in all areas of education is growing. They can form critical parts of distance education programs, collaborative research projects and joint-management schemes. Research shows that the development of personal relationships between team members is an important factor in effective working relationships in virtual teams. This paper reports part of a grounded action research study of seven virtual team facilitators in New Zealand. It will specifically look at how virtual team facilitators use electronic communication channels to build relationships with their virtual team members. The findings suggest that some electronic channels are more effective than others in building relationships and conclude that facilitators need to strategically use the channels available to them to effectively build relationships.

Introduction

This paper seeks to contribute to the general field of virtual teams by looking at how virtual team facilitators use electronic communication channels to build and manage relationships with their team members. Virtual teams can be defined as temporary, culturally diverse, geographically dispersed, electronically linked workgroups. Virtual teams may communicate and work synchronously or asynchronously through such technologies as electronic mail, bulletin boards, audio/video/data conferencing, automated workflow, online chat, electronic voting and collaborative writing (Coleman 1997). Virtual teams are playing an increasingly important role in organizational life and can offer organizations, including educational institutions, the flexibility to remain competitive. The benefits of virtual teams, particularly relevant in the areas of research and teaching, include reductions in costs and risks and expanded access to expertise and knowledge (Lewis 1998).

O'Hara-Devereaux & Johanson (1994) define facilitation as "the art of helping people navigate the processes that lead to agreed-upon objectives in a way that encourages universal participation and productivity", and place process facilitation skills as some of the most crucial for managing and leading global teams. Virtual team facilitators are often the center of a virtual team. They must be able to manage the whole spectrum of communication strategies via new technologies, as well as human and social processes.

Most of the extant research on virtual teams has been anecdotal and descriptive with little in the way of systematic, empirical research (Furst et al. 1999). This is particularly true when virtual team facilitators are the main focus of study. Although the importance of facilitators in virtual teams is noted in the literature (Kimball 1997; O'Hara-Devereaux & Johanson 1994), and suggestions for facilitating virtual teams are enumerated, no systematic research where the facilitator of virtual teams is the primary focus of study has been located. Nunamaker et al. (1999 p27) state that, "little research has yet been undertaken to understand and improve the process of distributed facilitation." This paper seeks to address some of these gaps.

Communication Channels in Virtual Teams

Technological infrastructure can strongly impact virtual team effectiveness in ways that a facilitator may or may not be able to effectively manage. For the smaller organizations, financial limitations are often a significant factor in the communication resources virtual teams have at their disposal. In global virtual teams, there may be significant problems with access to technology due to underdeveloped national infrastructure or the high cost of broadband internet connections. Software and hardware compatibility among team members is another issue that can affect the choice of communication channels.

However, while electronic communication channels support the networked organization by providing tools to solve collaboration oriented problems, Coleman (1997) warns that focussing only on technical issues can lead to expensive failures, while focussing on the people and al issues dramatically increases the possibility of success. al policies or the lack of them can impact the effectiveness of virtual teams. Many companies have no formal company or HR policies on virtual teams. Virtual teams are often formed on an as-needed, ad-hoc basis. Another issue that can be a factor is team member competence in using various technologies. This may be an al training issue, but in some cases it may be a member-selection issue (Jarvenpaa et al. 1998) as some people may have a psychological dislike for certain communication channels (Warkentin et al. 1997). Another one of these important "people" issues, is relationship building.

Stronger relational links have been associated with higher task performance (Warkentin & Beranek 1999) and the effectiveness of information exchange (Warkentin et al. 1997). According to Lau et al. (2000), effective communication is the key to successful virtual teams, and one of the keys to effective communication is how well team members are able to build and maintain their personal relationships. Kimball (2000) states, "the purpose of building and maintaining relationships in teams is to ensure that individuals develop at least enough harmony to be able to get their group work done". Building relationships with virtual team members is clearly of fundamental importance to a virtual team facilitator. According to Walther & Burgoon (1992), strong relational links are associated with enhanced creativity and motivation, increased morale, better decisions and fewer process losses. Research shows it is easier to complete relationship-building activities in a face-to-face context than in a strictly virtual one (Warkentin et al. 1997). This may in part be explained by media richness theory, which explains that the lack of contextual cues and timeliness of feedback inherent in computer-mediated communication can negatively affect the building of relationship links (Daft et al. 1987).

Research has found that computer-mediated teams do share relational information and are likely to develop relational links over time (Warkentin et al. 1997). However, since many virtual teams are project or deadline driven, there may not be the opportunity to allow relationships to develop over time. The idea of "swift trust", put forth by Jarvenpaa et al. (1998), describes how virtual team members may be able to accomplish tasks without first having developed relationships. This rational perspective centers on the view of "calculus of self interest" (ibid), which weigh the cost and benefits of certain courses of action between team members. If team members feel confident there will be a "payoff" for co-operating with and trusting virtual team members than they will do so. However, such trust appears to be very fragile and temporal.

In the following section, a methodology that generated data relevant to the question of how virtual team facilitators develop relationships with their team members is discussed.

Study Methodology

Because virtual teams are a new form of highly dynamic and ambiguous collaborative interaction, a major challenge of this study was the need to generate relevant data and analyse it in an appropriate manner. To achieve this, a research framework involving a training program format was instituted loosely based on methods already developed in action research, with data collection and analysis based on grounded theory methodology (Glaser & Strauss 1967; Strauss & Corbin 1990). This linking of these two research methodologies has been called grounded action research (Baskerville & Pries-Heje 1999).

The intent of this training program was three-fold: to generate interest and incentive for would-be participants, to give participants information and skills to initiate and facilitate their own virtual teams, and to generate data for analysis. After being recruited, participants were interviewed to determine their prior experience with virtual teams and their perceived needs and concerns in implementing and facilitating their own virtual team. The researcher then developed a ten-week training program to meet these needs. A pilot program and two subsequent training programs were held. As the participants took part in the training programs, each participant planned for, or actually initiated and facilitated a virtual team within their own organizational context. Data was collected from 1998 -2000 and came from face to face and telephone interviews, group discussions and e-mail correspondences. Some of the most significant concepts and their relationships to emerge from the data revolve around how facilitators use electronic communication channels to build relationships with their virtual team members, and this is the subject of this paper.

Results

Although the range of participants, their organizational contexts, virtual team lifecycles and virtual team tasks were varied, the data revealed a common concern among the facilitators as they went about the initiation and facilitation of their virtual teams. This concern has to do with building and managing virtual team relationships using electronic communication channels. According to the facilitators, the development of personal relationships between themselves and team members is an important prerequisite in establishing and maintaining virtual working relationships. What follows are descriptions and discussion of how the facilitators used the communication channels available to them to build relationships with their virtual team members.

Although face-to-face communication is clearly not an electronic communication channel, most of the facilitators in this study believe that face to face meetings, preferably at the formation of the virtual team, are the most effective way to build personal relationships. Why they feel this way is instructive, because in many cases they are seeking to emulate the relationship building processes and results of face to face meetings in their electronic communications. According to the participants, face to face meetings give facilitators the opportunity to understand individual team member communication styles and personal and professional motivations, making it easier to then move into virtual working relationships. One facilitator explains it this way,

> You can find out what motivates them, what makes them tick. That's what I think forms part of my thoughts on why you need to meet face to face. You may get a much richer sense of what is important to the person. I would find it much easier to say over a beer what is important to me then in a chat room.

Face to face meetings also allow a deeper kind of rapport, or trust to develop. For some of the facilitators, relationship building is a prerequisite to a working relationship, and face-to-face contact is an essential part of relationship building. In these cases facilitators can only use electronic communication channels after they have developed personal relationships. However, the facilitators working exclusively through electronic communication channels had to strategize ways to build relationships through the electronic channels they had available to them.

The facilitators see e-mail as the basis of their virtual teams' deliberations, effectively linking their distributed teams (Kettinger & Grover 1997), but they are unlikely to agree with Finholt's & Sproull's (1990) contention that e-mail can enable a team to create and sustain its identity without a shared physical setting, at least not by itself. The facilitators see e-mail as a channel more suitable for communicating information and coordinating projects than for building relationships. According to the facilitators the advantages of e-mail - being a universal platform, cost effective, generally accessible, easily learned, offering succinct messaging and the ability to send attachments quickly and efficiently - often carry a down side that on several occasions threatened to derail the facilitators' virtual teams.

One facilitator, who did not make any special effort to build a personal relationship with his team members before commencing a work relationship, relied almost totally on e-mail in his communications with team members. Because this facilitator is very comfortable using e-mail, he made the assumption that his team members were as well. This led to some serious miscommunications. In one instance he made an ironic comment in an e-mail that gave great offense to the team member, who was also the client. In another e-mail the team member "buried" a serious concern in an e-mail with a dozen other points. The facilitator overlooked the point, the significance of which became apparent only at the end of the team project. This problem concerns the low context text-based nature of e-mail, which requires the writer to clearly articulate the intended message (Barnes & Greller 1994). If the client had mentioned his concern in a face to face meeting, the facilitator would have picked it up. The facilitator explains,

> He did mention his misgivings in the first instance, but he did not put it out there very strongly and I dismissed it. In a face-to-face situation I would have picked up the nonverbal cues how stressed he was about the whole thing. But as a throwaway line in an e-mail on 10 different subjects….

Another important issue in virtual teams is the timely response of team members to internal communications. Kettinger & Grover (1997) noted that a significant feature of e-mail is that both the sender and recipient can control the timing of their portion of the communication. The facilitators in this study have clear expectations that e-mail, as well as other communication messages such as voice mail, will be replied to in a prompt manner. They believe that a lack of timeliness can lead to poor communication, the creation of ill will, and an undermining of relationships. Two facilitators sometimes felt a loss of control when using e-mail. They felt they were at the "mercy" of the recipient. When e-mail went unanswered for some time, they had to fall back on telephone calls to try and establish a direct link and rebuild relationships if necessary.

The telephone seems to be an old reliable standby for facilitators when it comes to building relationships with virtual team members. It is apparently more comfortable to use this channel when getting to know people. With the use of the phone being second nature, the facilitators feel that they can pick up paralinguistic clues from their team members, which can assist in relationship building (Perey 1997). Phone calls are often used at the formation of a virtual team in order to get know some one quickly. One facilitator found these initial phone calls useful for "groundbreaking types of conversations". She explains, "with a phone call I can get a feeling for them and they can get a feeling for me."

Picking up the phone may seem the obvious solution in getting to know team members when working virtually, but for some of the facilitators it is problematic. One facilitator, who owns a global consulting company, finds international telephone calls a major expense. He has resisted using them as a means to build relationships with clients and consultants, although he realizes that he needs to do something to strengthen team relationships. He generally uses phone calls to initiate business relationships, but believes the time and expense to use phone calls to build relationships is not practical. This facilitator feels quite awkward calling people he is involved with professionally to "chat about life the universe and everything". He explained these are busy people and when you use electronic channels it is expected that you will "get down to business".

However, this particular facilitator, who relies heavily on e-mail and synchronous text chat programs to communicate with his team, experienced a number of miscommunications with a team member that he attributed to a lack of prior relationship building. He realizes he is going to have to make a serious effort in the future to get to get to know his team members better before settling into work relationships. Although his organization is in tight financial circumstances he is now willing to invest in some "upfront" phone calls as an 'investment" in relationship building.

One of the most interesting findings in this study was the way facilitators used internet-based messaging and chat programs such as ICQ to set up opportunities for informal, spontaneous communication between facilitators and team members. ICQ is free software that allows its users to know when (in this case) virtual team members anywhere in the world are connected to the internet. It then allows one member to contact another directly and to open up a chat box to hold synchronous typed conversations. Two facilitators looked to ICQ to build personal relationships in their teams. By its nature, ICQ can lead to spontaneous, informal conversations between team members that the facilitators believe can help to strengthen relationships. For one facilitator, with no opportunity for face-to-face meetings, the informality and spontaneity engendered by the use of ICQ was an important relationship building channel, which complemented the more task-oriented e-mail channel. He actively encouraged the downloading of ICQ as one of his first actions in the initiation of his virtual team. He explains his motives,

> The idea of ICQ was not as a group meeting thing, but to get some conversations going between the people in the group. And if they were using ICQ properly they would know when anybody else in the group was online. In fact the few conversations with people I had who were on line at the time were more time of day conversations, how are you type, not about anything substantial. But the thought was and it may well bear fruit in the longer term, was that if everybody was on ICQ and if we kept going with this process than the opportunity was there for people to talk privately. And I felt the ICQ thing could provide the corridor type of relationship where tasks can progress without the use of planned meetings.

This use of ICQ mirrors suggestions made by Kraut et al. (1993) that informal encounters create a common context and perspective that support group work. ICQ may facilitate socialization processes that allow team members and facilitators to participate in activities happening at the 'backstage' (Goffman 1990), where they can exchange feelings and emotions thus building and maintaining relationships and minimizing feelings of isolation that can lead to reduced intrinsic involvement in the team (Finholt & Sproull 1990).

Desktop videoconferencing is another channel that holds great promise for the facilitators in this study. They believe that "eyeing" people is an important part of relationship building, particularly when the only alternative is e-mail or synchronous text-based meetings. Videoconferencing has been in use since the early 1960's (Perey 1997), but in the past it was expensive and the quality was not good. However new internet-based desktop videoconferencing technology is bringing the cost down, although the quality and reliability of internet-based transmissions are often poor.

Most of the facilitators are very interested in incorporating Netmeeting, a free software program by Microsoft and one of the most common desktop applications, into their virtual teams and some experimented with it during the training program sessions. In desktop videoconferencing, they see a low-cost virtual communication channel that could provide a workable alternative to face to face meetings. Netmeeting, for example, allows two people anywhere in the world to see and hear each other. It also allows team members to share and work on documents. One facilitator believed that setting up an internet-based video conferencing communication channel with an overseas branch office would build personal relationships resulting in greater personal trust between geographically separated organizational members thus strengthening the organization as a whole. As he explains,

> I don't mean trust in a professional level of trust, but just getting to know the person, building a relationship with Graham in Melbourne. To my mind, that's the key output or objective of a lot of this.

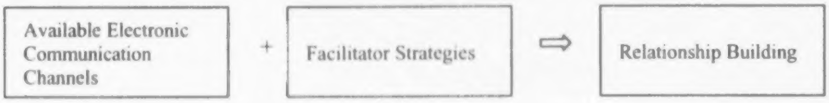
Lau et al. (1999) argue videoconferencing can enhance social relationships by putting a face to the name. Perey (1997) states conscious and unconscious communications supported by two-way video can build and nurture relationships. . However, a recent study looking of the effects of desktop videoconferencing on improving trust relations in virtual teamworking projects (Nandakuhmar 2000) suggest information and communication technologies, such as Netmeeting, appear to be inadequate for building "trust relations", primarily because they do not support 'backstage' access, normally found in face-to-face environments. In any case, the use of internet-based video conferencing communication is still problematic, as access to sufficient and reliable bandwidth is a significant barrier to many potential users.

Conclusion

Successful virtual teams often use different technologies to enhance the breadth and depth of their communication (Lau et al. 1999). Facilitators in this study realize that they would have been unable to operate virtual teams and accomplish their project tasks without electronic communication channels. At the same time they understand that the use of these channels as the main working communication channels in their virtual teams would be problematic, without having first established personal relationships with team members. The development of personal relationships, according to one facilitator, would make the building of a team "culture of cooperation" more likely. In order to build relationships, facilitators need to strategically use the communication channels they have available to them.

This study finds that when face-to-face meetings are not an option, virtual team facilitators can effectively use electronic communication channels, particularly some of the more familiar or higher-context virtual channels such as the telephone or desktop video conferencing to build relationships with team members. ICQ also seems to hold some promise as an "backdoor" channel that may encourage informal communication and relationship building. The key challenge for virtual team facilitators is to make a conscious and concerted effort, which can be termed facilitator strategies, to develop personal relationships with team members through the use of available communication channels (Figure 1).

Figure 1: Relationship Building in Virtual Teams



Facilitator strategies will include the selection and use of appropriate communication channels and appropriate message content. The level of relationship between the facilitator and team members necessary to accomplish the team's task is one of the key determining factors in creating a facilitator's strategy. Other important factors in determining facilitator strategies, some of which are alluded to in this paper, include issues concerning team member selection and training, organizational and HR policies, as well as the team's desired task outcomes and cultural biases toward communication channels particularly in global, multicultural virtual teams.

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Silk Purses out of Pigs' Ears: The Conversion of Reluctant or Intimidated Students (Especially Teachers) into Keen Users of The Internet in Education

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Abstract: If 'the internet in education' is framed and conducted strategically with at least a little insight rather than in an *ad hoc* way, then learners will be more likely to not only forgive you but even thank you for guiding them through the inevitable stage of temporary frustration to the initial steps of self-empowerment. The paper outlines an integrated approach which would not only encourage but actually serve to 'convert' reluctant learners into actual keen users: (a) as a theorization of the presenters' own experiences with teacher education courses; (b) in terms of simple activities involving, say, information literacy and web design linked together to produce an initiatory 'aha' effect of seeing underlying or generic connections between a variety of internet skills, processes and potential educational applications; and (c) with an appreciation of how even 'difficult' students can be most impressive if allowed initiative with their own learning. The paper will further discuss three *practical stages* in the process of 'internet in education' conversion which also constitute *key principles* of an integrated theoretical framework.

Introduction: the transition from old to new learning

There are many human transitions and life experiences where reasoning by reflection or through discussion with others is not enough if a person is to effectively respond to new or inevitable challenges and develop changed habits and practices. For many in the electronic age – especially those who grew up accustomed to books and mere machines – the computer with its various additional networking and multimedia functions represents one exemplary instance where people often need help to individually tackle and overcome underlying fears and critical thresholds in order to proceed confidently in life. Fine ideas about the possibilities and potentials of fundamental new media of human communication and knowledge are not sufficient also. Many people need to be *converted* (not just *convinced*) through progressive and purposeful stages of first-hand practical experience also. On the other hand, young 'internet-savvy' kids today are almost instinctively aware of and easily converted to the attractions and possibilities represented by interactive electronic media. However, those brought up to feel very much at home in the digital age with all its multimedia seductions may well have an increasingly greater need to be converted rather to some of the enduring human needs and possibilities of education exemplified by or mediated through spoken and written words. The discussion below is thus ultimately concerned with the convergent problem of getting any student (including older, parental, and especial teacher learners) interested, excited, and personally engaged with both the process of learning and the use of new technologies – that is, is concerned with the dialogue between *old* and *new* ways in which young and old students alike learn to productively interact with a changing world.

This paper further represents a distilling of the presenters' personal experiences over several years in terms of a similar reflective inquiry into the problem of integrating computers and the internet more effectively in teacher education courses. Taking the path that such courses really need to have some degree of practical grounding to have any significant degree of applied or even critical integrity, both presenters have come to appreciate that the path towards a more integrated and effective approach towards Information and Communication Technologies (ICTs) in formal teacher education especially is: (a) somewhat similar across different cultural contexts; and also, (b) recapitulates the inevitable learning stages navigated by individual learners of new electronic literacies and technologies. Various innovations help to make this less intimidating and frustrating, and more effective - for instance, the provision of needed support and resources, the 'grounding' of learning and assessment in terms of activities and reflections through electronic portfolios, and allowing an overlap between learner's *utilitarian reasons* and *personal motivations* (i.e. work and pleasure) for using various programs and functions. Beyond this, however, there has been a strong sense of how students generally have viewed such courses in retrospect as a 'journey' of engagement initial fears and frustrations - where an engagement with initial fears should give way to a sense of renewed confidence as well as to the excitement of new worlds of possibility.

Most salutary have been the examples of how some of the initially frustrated and intimidated students went on to become some of the biggest success stories in these courses. Of course, we were only too well aware that this was largely their own doing, and also that particular students were exceptional in that they were able to transform initial skepticism into effective practice because they were critically reflective but still sufficiently open to new possibilities. But the question both of us asked when starting new jobs and assigned to teach an introductory ICT skills together was this: if we could only identify more effectively some of the key principles of a successful ICT learning process exemplified by those exceptional students, then we might also develop courses which integrate ICTs more effectively. In the process of attempting to do this in terms of connecting the *macro* and *micro* levels of an integrated framework then, we came to appreciate more fully that this is above all else a process of 'conversion' in which the stages of developing ICT *competency* involve a transition across a threshold of 'temporary frustrations'. Prior to learner conversion, teachers face an uphill struggle against the inertia of initial frustration and general boredom or reluctance. Following conversion, learners become intrinsically motivated by the very nature of a new, powerful, and exciting medium. Enthusiastic learners allow teachers to focus more on designs for applied and higher-order learning (i.e. teaching in the timeless sense of the term), rather than just perpetually getting to 'first base' in the learning process.

Why reluctant or intimidated users of computers and the internet need to be 'converted' in a practical way

Anyone attempting to integrate ICTs in their learning or teaching is up against more than just a simple fear of computers – as pervasive and intimidating as that might be. Indeed, those reluctant to enter the digital age have perhaps not been intimidated so much by computers or the internet specifically, but possibly more by how the social and educational implications of computer networking and associated multimedia have tended to be viewed and discussed in polarized terms of either *positive potentials* or *negative dangers* – with little room for *balanced* or well-informed discussion. Like other technological 'breakthroughs' before, various programs and functions of the internet are regularly and uncritically lauded in a way which may ironically reinforce a general sense of passivity, superficial understanding, and an attachment to old ways of practice. Many people set up an endless cycle of unrealistic expectation and subsequent disappointment by projecting onto the latest new technological tool or concept their secret wish for a 'magic bullet' which would allow them to passively master wonderful new skills and functions without having to get their own hands on the keyboard, without progressively developing a basic ICT competency in terms of thinking about relevant or possible applications. The uncritically optimistic embracing of new ICTs in general as a prescription for future education is often pursued with little understanding of what is needed for effective integration, and in a way which may devalue enduring notions and objectives of education held by parents and teachers. Conversely, an uncritical pessimism which is so quick to point out these faults is not only often blind to valid future possibilities but tends to romanticize and gloss over the existing faults of formal education as a context for learning.

Similar contradictions and ambivalence are evident at the 'micro' level of individuals attempting to become technologically literate and to integrate ICTs into their learning or work, and into their everyday generally. In other words, new technologies represent a useful focus for understanding that what people *say* and *do* is not always consistent – even when people are sincere and well-intentioned. To put it another way, many people are not fully aware of their own underlying preconceptions and prejudices about ICTs (Richards, in press). This includes optimists as well as pessimists. The naively optimistic learner who dares to undertake an unrealistic or overly-ambitious use of computers or the internet for whatever purpose may experience the kinds of initial frustration and failure which results in them becoming the kind of cynical pessimist who is equally closed off from further progress and a balanced appreciation of possibilities and potential applications. In short, naïvely optimistic and cynically pessimistic approaches to IT in education specifically and society generally both tend to reinforce a vicious circle. Thus the rhetorical polarization between optimistic and pessimistic perspectives at the *macro* level of policy, theory, and mere rhetoric often translates into self-fulfilling prophecies of initial failure and disillusioned expectations at the *micro* level of hands-on practices and specific learning objectives.

As already indicated, mere 'intellectual conversion' is not enough to effectively learn to use computers and the internet. Perhaps one of the main reasons why teachers often lag behind parents, policymakers, and others who increasingly subscribe with enthusiasm to a future digital paradigm of education is possibly that they realize better than anyone else how much damage can be done if this is not done well and in a truly integrated way. Teachers inevitably have first-hand experience of the pressures and dilemmas of what might be referred to as the 'macro-micro gap' or 'missing link' between forward-thinking policies and well-intentioned theories on one hand, and specific requirements for across the curriculum integration and hands-on learning on the other (i.e. between *thinking* and *doing*, and also educational *content* and the learning *process*). They are expected to respond to new policy directives for ICT integration in education and somehow translate these into integrated practices of teaching and learning. Although most teachers are quite aware of the increasing and inevitable importance of the internet for the future, many are simply unable to overcome subconscious resistances and rationalizations to become effective ICT learners themselves, let alone provide learning environments for their students to do this. People who are keen users of the internet are more likely to have become so through the self-taught approach (otherwise known as the 'trial and error' or even 'sink or swim' method), often with the informal assistance of friends, rather than through formal training, structured courses, and designated support.

In other words, there tends to be a great gap between *self-learning* and *formal education* when it comes to ICTs. For most people the 'conversion' to ICT competency is a relatively *ad hoc* process driven more by accidental needs or unspoken desires than a visionary plan. However, if ICTs are not integrated into education effectively then teachers are failing to harness or 'convert' the power, the excitement, and the applied possibilities of a new medium which can open up new worlds of possibility for learners (Richards, 1999, 2000). A younger generation of students tend to find the world of the internet and interactive multimedia exciting in contrast to the traditional focus on content knowledge in schools. Those teachers who completely ignore or arbitrarily dismiss the world of the internet and interactive multimedia in contrast to the traditional focus on content knowledge in schools will only reinforce young learners' sense of boredom and even resistance in relation to 'old' notions of education. They will also lose any remaining 'connection' with their younger students. Young learners will inevitably interpret such reluctance and even antagonism towards digital media as some sort of signal that their teachers are not really interested in them or their learning – reinforcing a cultural gap between formal education and popular everyday contexts of informal learning. In contrast, strategic teachers do not resist or oppose ICTs generally, but attempt to harness student interests in new media and convert this into productive applications and many of the educational values of 'old' learning.

The conversion of reluctant or intimidated students (especially teachers) into keen users of Information and Communication Technologies (ICTs)

The term *conversion* is often used to refer to the process by which an external agent directly effects a fundamental transformation in somebody or something (e.g. In the sense that a priest or politician might convert someone else to a religious or ideological point of view, or that an alchemist or scientist seek to transform a physical substance into another form). It is used here rather in the two related senses of : (a) a general harnessing of student interest in the internet for learning purposes; and (b) a more specific but still indirect framing of the student learning process. In the general sense, this is really more a facilitation of the learners' -conversion' from reluctant or intimidate student to keen user of the ICTs as suggested earlier, akin to the notion of a journey that is its own destination. The idea of *conversion* used here is thus also an adaptation of the anthropologist Victor Turner's (1967) notion that learning can be transformed by the liminal dimensions of undergoing a symbolic journey to achieve knowledge grounded in practical experience. The discussion below will thus revolve around the idea that the design of a course structure can always be further refined, and that learning environments for integrating ICTs in education can always be made more effective. Such an idea reflects some underlying principles of transformation which are not simply accidental but represent transferable principles. In terms of an earlier distinction between the process of *self-learning* and *formal course provision*, it represents a kind of 'middle path' between theory and practice which embraces both intellectual and practical conversion.

The three sub-sections below represent three *practical stages* in the process of 'internet in education' conversion, as well as constituting *key principles* of an integrated theoretical framework. The first section - setting the stage for transformation - discusses the 'cultural' as well as technological requirements for designing learning environments: requirements which are relevant to the changing role of teachers in the internet age, and will also appropriately encourage, support, and guide learners to venture out of existing 'comfort zones' into the realm of that which is new, unfamiliar, or undergoing change. The second section will discuss the convergent stage of an initial 'aha' effect experienced by learners within an integrated framework as they begin to see the connections between internet skills and programs, experience a provisional sense of accomplishment, effective interaction, and appreciate new media possibilities. In the third section, the paper discusses the ongoing conversion progress in terms of a generic 'internet literacy' geared for across the curriculum applications, and also the progressive and productive links made between personal and academic learning objectives.

Designing the context of conversion -

An effective learning environment for ICTs in education requires both indirect and direct elements of design and development which together constitute a 'middle path' between a flexible self-learning process and the formal structure which integrates various elements in relation to the specific context at hand. The *indirect* requirements for this simply relate to the various ways in which students can be encouraged to feel more relaxed, confident, and interested about learning to use ICTs for educational purposes. In other words, a *strategic* rather than *ad hoc* approach attempts to take an integrated approach towards the use of ICTs in education in terms of the following different elements: the provision of better support or safety nets for individual learners; customization of courses in terms of greater relevance to immediate needs or personal interests; a focus on transferable generic skills and applied orientation rather than on skills in a vacuum; and a more integrated approach to the connections between content and process, learning and assessment, etc.

The more *direct* elements of IT integration relate to a basic *activity-reflection cycle* at both the macro and micro level of student learning. At the micro level, this cycle refers to the use of specific learning activities to ground reflective knowledge in hands-on practice and also familiarize students with various programs and skills in terms of an applied focus. Of course, the specific design of any course which attempts to effectively integrate ICTs would be dependent on its overall context, purpose and structure. As an organizing strategy of learning and assessment at the macro level, the activity-reflection cycle represents an integrated approach to not only using ICTs in education but using them as general tools for more effective learning. Mention was made earlier to how such an approach can go beyond a mere 'skills acquisition' approach to also focus on both indirect and direct requirements of *attitude* and *application* in the use of ICTs in education. Lending itself to concepts of *project-based learning* and *electronic portfolios* (i.e. as specific learning and assessment tools), an 'activity-reflection' approach allows a teacher or designer of learning to distinguish in practice between mere competency and higher-order stages and levels of learning using ICTs. Representing a *strategic* approach which contrasts with a merely *ad hoc* one of 'just-in-time' planning, it provides a more effective context for reconciling *general* and *specific* learning objectives on one hand, and the often contradictory educational imperatives of *content* and *process* on the other.

Above all else, a strategic approach to using ICTs in education aims to get students to link up their 'thinking' and 'doing', to become more effective reflective practitioners, and to ground their conceptual and content learning in actual contexts of practice and process. In contrast to the traditional classroom, the internet is a relatively 'authentic' learning resource for various 'generic skills' which involve the accessing of information, communication, and interactive learning. It encourages actual as well as hypothetical exercises in cooperative or independent problem-solving – as policymakers and other academic advocates are aware, a natural vehicle for collaborative, independent, and life-long learning. In contrast to written or print media, its facility for self-expression and publication (eg. student assignments developed as webpages for a potential audience beyond the teacher, or perhaps as online interactions with other classrooms or learning communities) represents a most powerful and motivating culmination of the learning process. The key to integrating the internet and associated electronic multimedia in education, and using ICTs to transform education generally, thus lies at the intersection between personal motivation and potential utilitarian or work purposes. To see a connection and make this link also requires a conversion or transformation in thinking and perception from traditional modes of education.

The initial act or stage of conversion

The realization of creative or critical insight has perhaps most appropriately been referred to as the 'aha' effect (Koestler, 1989). It is thus a useful term to refer to how the transformation of bored or resistant users of the internet and computers generally in education into keen users often involve a change of perception and thinking. For some people, the transition from seeing mere data, skills and machine parts in a reductionist way to appreciating the internet as the media of a new paradigm of human literacy and learning will be gradual process of realization with a particular stage of conversion – for others, especially the most reluctant, intimidated or resistant generally, it can be an instantaneous act of transformation. The act or stage of conversion was linked above to two related 'missing links': firstly, the problem of linking macro and micro levels of educational design by teachers; secondly, the issue of linking student thinking and doing. As a convergent dilemma, *conversion* may thus be identified here as either an abrupt or gradual resolution to the threshold or predicament of temporary frustration involved when people attempt to learn and use new technologies. In other words, the need for conversion to the educational possibilities of the internet and associated multimedia is, in varying degrees, for everyone a general stage of engagement with a new mode of human literacy which is recapitulated every time a new skill or program is encountered or even applied in a different context. Just as there are those who can master specific skills but still not see overall applications, there are also many people who will not be motivated, confident or even intellectually convinced to undertake even basic skill acquisition until they can see the greater context or picture of relevance – a vision of potential applications and possible needs.

The key point of this paper is that the process by which exceptional individual learners in particular informally overcome their initial frustrations and get converted to internet literacy might be structured into formal course provision and education generally much more effectively as a strategic design rather than merely ad hoc happening for all learners. Top-down educational policies for general ICTs integration also require the more informal, bottom-up, and 'cultural' elements of effective specific or micro integration as indicated above, at the contextual levels of actual resourcing rather than merely hypothetical access, and in terms of actual learning and assessment practices as well as direct connections to subject-specific curricula. Effective course design will become easier when a critical threshold of internet and digital literacy is achieved by teachers and learners alike. In two related presentations at this conference, we have discussed in more specific detail how the initial conversion of an entire class of reluctant or intimidated learners might be achieved in an introductory internet skills course which capitalize on how many of the basic functions of the graphic interface for computers and the internet are similar for different programs, and also involve a range of transferable skills. Such courses provide an exemplary focus for the process by which ICTs might be integrated generally across the curriculum in terms of developing applied thinking in initial familiarization activities – an orientation grounded in transferable skills and knowledge in relation to generic or typical computer and internet programs. To have enduring effect, any initial act or stage of conversion into the future possibilities and requirements of ICTs in education needs to be grounded in actual practice to some degree and also transformed into a habitual yet confident and flexible practice (i.e. an ongoing or regular 'literacy'). It is one thing to have an insight into new possibilities; another to translate this into regular practice. 'Conversion' is thus an ongoing process beyond an initial act or stage.

The ongoing process of conversion

This is a stage where provisional insights begin to be transformed into new habits or changed practices, and initial excitement is converted into the quiet confidence of a grounded reflective practice. In terms of the typical opposition between naïve enthusiasm and cynical resistance to ICTs in education outlined earlier, it represents substantial progress along a 'middle path' often represented as a kind of journey by students. The 'creative integration' of ICTs in education has been usefully recognized as the culmination of a series of learning stages proceeding from initial skill acquisition to eventual applications (Somekh, 1998). However, like other similar models, Somekh's stages represent a somewhat linear progression which does not do justice to the challenge of crossing the 'threshold of temporary frustrations' as it has been identified here in relation to the learning of ICTs and new technologies.

The concept of conversion was invoked in order to describe and discuss how the 'critical point' of a transition from basic ICT competency into effectively integrated and applicable knowledge is as much an attitudinal and even cognitive transformation as a process of sufficient skill acquisition. This is the key challenge for an ongoing process of conversion. Just as conventional models of computer education have tended to emphasize the acquisition of skills within a vacuum, so too many teachers make the opposite 'error' of focusing on the extent to which ICTs might be directly relevant to the teaching and learning of subject-specific content. An inadvertent result of this 'add-on' approach is that an opposition is implicitly set up for many students between the exciting medium of the internet with all its popular cultural associations on one hand, and a growing perception of content learning in subjects like history and mathematics especially as boring or even irrelevant in comparison on the other. The concept of a threshold of conversion in the learning and use of ICTs in education provides a focus for teachers to conceptually as well as practically overcome a sense of entrapment in a series of related self-defeating binary oppositions in education: for instance, naively enthusiastic *vs* cynically resistant perspectives, content *vs* process objectives, personal *vs* utilitarian interests, and generic *vs* specific skill acquisition. Instead of having to merely theorize the great gap between initial skill acquisition and eventual mastery of this as applied knowledge, teachers should be able to focus on making practical connections and themselves crossing the critical threshold of 'temporary frustrations'. Put simply, teachers would be well advised to: (a) focus more on generic skills of learning with ICTs than either specific skills or content knowledge *per se*; and (b) to begin courses with introductory activities which aim to connect with student immediate interests and needs, and later develop the course in a way which can be more directly related to higher-order knowledge applications of ICTs.

Teachers are often resistant because of a perception that ICTs represent a threat to the integrity of their subject as a specialist curricula. Such teachers would find that ICTs encourage the kind of generic learning and literacy skills which have specific application to different subject areas as well as cross-disciplinary approaches to knowledge in the applied sense. At this point it should become easier for educators to appreciate how and understand why ICTs are not really a threat to the educational profession and the traditional roles of the teacher. Rather, used effectively, they may provide the means for allowing some negative roles (e.g. mere information or skill-in-a-vacuum transmitter, discipline provider, and child-minder) to become less burdensome. Conversely they offer potential to encourage teachers to design contexts of learning which encourage collaborative and independent learning, critical and creative thinking, and collective and individual self-knowledge.

Conclusion: Educational implications of a conversion model?

Perhaps the most well-known model of education as a process of conversion is still the Socratric questioning technique as a method to lead students into making transformative connections between knowledge and ignorance, as well as thinking and doing. Socrates' view of the teacher as a kind of 'mid-wife' facilitating the birth of new knowledge in students has particular relevance for the integration of IT in education. In contrast to the traditional 'transmission' models of education (i.e. where the authoritative teacher transmits 'knowledge' to passive and empty-minded students) and associated theories of learning such as behaviorism, many recent and influential theorists have emphasized the constructivist implications of ICTs in education (e.g. Jonassen, Peck , & Wilson, 1999). The 'conversion' model of learning with technology advocated here embraces many of the principles of constructivism but goes beyond this approach in two important senses: (a) it recognizes learning with ICTs in terms of crossing or overcoming a threshold of 'temporary frustrations' which delineates initial skill acquisition and attitudonal polarization or ambivalence on one hand, and the applied knowledge of grounded reflective practice on the other; (b) it emphasizes the still important role of the teacher as a designer, modeler, and facilitator of effective learning environments and learner conversion.

The conversion model outlined above derived from initial efforts to reconstruct formal ICT course design in terms of key 'self-learning' stages discerned in learners who exemplified the transition from reluctant or intimidated learners to confident computer-literate or 'internet-savvy' practitioners. These students were able to bridge the gap between *thinking* and *doing* (also personal interest and utilitarian purposes) in terms of a conversion effect which was built on the crucial interplay of effective attitude and sufficient skill acquisition. Likewise, the integration of ICTs in formal education requires an interdependent framework of technological and human resources, curriculum and pedagogy, and learning and assessment which addresses the 'macro-micro gap' in a strategic rather than a merely ad hoc way – the crucial interplay of top-down imperatives of policy, theory, and rhetoric on one hand, and hands-on practices or specific learning objectives on the other . Thus, the key stages of educational conversion (i.e. relevant context preceding initial and ongoing transformations of the link between thinking and doing) also constitute key principles of an integrated approach to ICTs in education – the design of effective learning environments and processes, the facilitation of an initial 'aha' effect where learners begin to see new connections and applied possibilities, and the ongoing conversion progress in terms of an across-the-curriculum ICT 'literacy'.

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A Rubric for Assessing the Interactive Qualities of Distance Learning Courses: Results from Faculty and Student Feedback

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Abstract: Results of studies of distance learning courses indicate that interactive qualities seem to be a major factor in determining course quality as reflected in student performance, grades, and course satisfaction. That is, the more interactive the course, the more effective it is. However, the field reflects considerable disagreement on what these interactive qualities are and how they should be assessed. This paper offers a rubric to help instructors begin to identify and self-assess these qualities in ways that assist them in improving their distance courses. Included in this paper are: an explanation of rubrics and their uses; a review of literature related to interactive qualities that led to identifying elements for the rubric; a discussion of methods used to gather feedback and revise the interactive qualities rubric draft; and a copy of the revised rubric itself.

Introduction

Distance learning research literature supports the observation that a primary factor shaping course quality and effectiveness is the amount of interaction in the course (Fulford & Zhang 1993; Klesius, Homan, & Thompson 1997; Zhang & Fulford 1994; Smith 1996; Zirkin & Sumler 1995). Zirkin and Sumler found that interaction seemed to have an impact on students' achievement, as well as their satisfaction: "The weight of evidence from the research reviewed was that increased student involvement by immediate interaction resulted in increased learning as reflected by test performance, grades, and student satisfaction" (p. 101).

However, there seems great variation in what faculty and students view as "interactive qualities." In order to clarify the role of this important factor and encourage faculty to make their distance courses more interactive, the authors decided to design a rubric for faculty to use to determine the degree of interactive qualities in their own distance learning courses (Roblyer & Ekhaml 2000). Such a tool, based on information obtained from a review and analysis of a considerable body of literature and research on this topic, was seen as an ideal mechanism for focusing the attention of distance learning instructors on the importance of interactive qualities and the elements that might contribute to them.

What is a Rubric and How Can it Help?

Rubrics are assessment tools that have seen increasing application in technology applications, especially in problem-based, constructivist environments (Jonassen, Peck, & Wilson 1999). Jonassen, et al. say that a rubric has come to be defined in education as "a tool used for assessing complex performance" (p. 221) in a way that gives input and feedback to help improve the performance. A rubric consists of a set of elements that describe the performance together with a scale (e. g., 1-5 points) based on levels of performance for each element.

Malone, Malm, Loren, Nay, Oliver, Saunders, and Thompson, (1997, October) point out that both students and faculty have additional responsibilities in a distance environment. Faculty must alter both course design and teaching strategies to take advantage of technologies and assure maximum interaction. But they say that students must assume more responsibility for their learning taking the initiative for requesting clarification and feedback to make up for the immediacy offered by face-to-face formats. Malone et al., cite the need for well-researched criteria to help faculty know what they are aiming for when they evaluate the effectiveness of their distance courses. Thus, an interactive qualities rubric may address a need that currently is unmet. If effectively done, a rubric that presented such criteria could help develop distance learning as an effective instructional delivery format.

How Do We Define "Interactive Qualities" in Distance Learning?

As a first step toward identifying qualities and activities that would enhance distance learning courses and that could be assessed in a rubric, the authors reviewed definitions of terms used in the research literature related to interaction. We found not only one word but two: "interaction" and "interactivity." Also, we discovered some consensus and some areas of disagreement in defining and using these terms.

Based on their review of literature, Gilbert and Moore (1998) define interactivity on computer-mediated instruction as a reciprocal exchange between the technology and the learner, a process that he says is referred to as "feedback." Gilbert and Moore use the terms "interaction" and interactivity" interchangeably. However, Wagner (1994, 1997) draws a sharp distinction between the terms. Like Gilbert and Moore, she says that "interaction" is an interplay and exchange in which individuals and groups influence one another. Thus, interaction is when there are "reciprocal events requiring two objects and two actions (p. 20). On the other hand, she says "interactivity" seems to have emerged [illegible] y for establishing connections from point-to-point ... in realtime" (p. 20). Thus, interaction focuses on people's behaviors, while interactivity focuses on characteristics of the technology systems.

This distinction may add precision to our efforts at assessing distance learning courses, but it is evident that both qualities are necessary to achieve the aspects students find so desirable and that appear to be major contributors to course effectiveness. Also, it is clear there is a close relationship between these qualities; one cannot exist without the other. Technologies that allow high INTERACTIVITY seem necessary to allow high person-to-person, person-to-group, and person-to-system INTERACTION.

Can Distance Learning Offer Enough Interactive Qualities?

It should be noted that the literature in this area reveals some doubts among students and faculty that distance learning ever can have the degree of interaction possible in a non-distance environment. For example, a study by Smith (1996) found that about 30% of the nearly 400 respondents to a survey about distance learning options would never choose DL because they felt that it could never provide the qualities they desire in a face-to-face course. However, studies such as one by Miller and Webster (1997) have found no significant difference in assessments of interaction between students in a synchronous (face-to-face) and asynchronous courses. Horn (1994) and Hirumi and Bermudez (1996) are among those who find that, with proper instructional design, distance courses actually can be more interactive than traditional, face-to-face ones, providing more personal and timely feedback to meet students' needs than is possible in large, lecture hall-type face-to-face courses.

Elements of Interactive Qualities in Distance Learning Courses

Variable #1: Social and Rapport-building Activities

Gilbert and Moore (1998) and Wolcott (1996) note that establishing rapport and collaboration among class members and between class members and instructor is an important role the instructor must undertake in a distance course. They find that interaction in distance courses can have either social and instructional aims. Gilbert and Moore (1998) feel that both purposes are valid and, indeed, necessary, noting that social rapport and increased collaboration can lead to greater levels of interaction related to course content which, in turn, can promote instructional goals and increase learning.

Variable #2: Instructional Designs for Learning

Distance learning studies indicate that effective distance courses are ones in which the instructor promotes interaction in ways that encourage reflection and discussion on course topics and concepts. Much of the literature in this area focuses on instructional designs to increase this kind of participation and feedback (Roblyer & Ekhaml 1999). The focus of this dimension seems to be on increasing not only the number of interactions but the number of people involved in them. For example, having students present and discuss small group results with the class is perceived as a better design than merely having students do small group work and present to the instructor.

Variable #3: Levels of Interactivity of Technology Resources

Many authors describe that various technologies can be used to encourage and facilitate interaction. Recognizing that certain technological capabilities make it easier to encourage interaction, the rubric presented here uses Wagner's (1994, 1997) definition of interactivity as the innate capability of the technology to promote interaction. Desktop videoconferencing (Edmonds 1996) and web-based resources (Hughes and Hewson 1998) currently enjoy increasing popularity. However, it should be noted that equally important to the innate capabilities of technology resources are the techniques, designs, and methods used to take full advantage of them (Kimeldorf 1995)

Variable #4: Impact of Interactive Qualities as Reflected in Learner Behaviors

The last dimension involved in assessing interactive qualities of courses seems the one most often neglected: the impact on learners. McHenry and Bozik (1997) point out that students respond to effectively (or ineffectively) designed distance courses with observable behaviors. This dimension evidences itself most often in students' increased or decreased willingness to use the various technology resources (e. g., chat features, microphones), to collaborate with other students, to take responsibility for requesting needed information from the instructor, and to initiate and participate in class discussions and other activities. Thus, instructors can tell if their designs are working if, by the end of the course, students show increased willingness to participate and initiate interactions.

Methodology Used to Develop and Revise the Rubric

After the four elements were identified, the rubric was developed by creating a 1-5 scale with descriptions of levels of performance for each element. A checklist for evaluating the usefulness of the rubric was developed based on criteria for effective rubrics in described by Jonassen, Peck, & Wilson (1999, p. 225). This rubric evaluation checklist is shown in Figure 1.

Instructors and students who are currently involved in distance courses at the University of West Georgia were asked to use the checklist to review the rubric and give their feedback on aspects that should be revised to make the rubric more useful. Some 35 instructors and students responded with comments and suggestions, and the rubric was revised based on their feedback.

Elements: Comprehensiveness – Are all of the important elements of "interactive qualities" identified?

______ Important elements are missing. Please list: ______________________________
______ All important elements are all identified.

Elements: Unidimensionality – Are all elements reduced to their most basic components, or do they represent two or more factors that are better addressed separately?

______ Elements should be broken down further. Please list: ______________________
______ Elements are uni-dimensional. They cannot be broken down further.

Ratings: Distinctiveness – Do ratings represent clearly different categories, or is there overlap or ambiguity?

______ The descriptions for the 1-5 ratings of one or more elements overlap. Please tell which:
______ There is no overlap. Ratings for each element are distinct from one another.

Ratings: Comprehensiveness – Are the correct number of ratings present?

______ Five points are *not enough* or *too many* for the rubric scale. Please tell which: ________
______ Five points is the correct number to cover the range of interactive qualities.

Clarity – The extent to which distance instructors and students will understand the rubric.

______ Instructor and students will not understand some terms. Please identify: ____________
______ Instructor and students will understand all terms

Figure 1. Checklist for Evaluating Interactive Qualities Rubric Draft

Revised Rubric: Current and Future Uses

The revised rubric is shown in Figure 2. For this rubric to be most useful to distance instructors, they must first have read the descriptions of the elements and be acquainted with the definitions and, ideally, the uses of the technology resources described.

This rubric is viewed as one of many tools that could help improve the quality of distance learning courses in ways that make them more responsive to student needs. Plans are underway to do additional formative evaluations and revisions of this instrument to increase its usefulness as a self-assessment tool for instructors of distance courses.

RUBRIC DIRECTIONS: The rubric shown below has four (4) separate elements that contribute to a course's level of interaction and interactivity. For each of these four elements, circle a description below it that applies best to your course. After reviewing all elements and circling the appropriate level, add up the points to determine the course's level of interactive qualities (e.g., low, moderate, or high)

Low interactive qualities	**1 - 7 points**
Moderate interactive qualities	**8 -14 points**
High interactive qualities	**15-20 points**

Scale (see points below)	**Element #1 Social Rapport-building Activities Created by the Instructor**	**Element #2 Instructional Designs for Learning Created by the Instructor**	**Element #3 Levels of Interactivity of Technology Resources**	**Element #4 Impact of Interactive Qualities as Reflected in Learner Response**
Few interactive qualities (1 point)	The instructor does not encourage students to get to know one another on a personal basis. No activities require social interaction, or are limited to brief introductions at the beginning of the course.	Instructional activities do not require two-way interaction between instructor and students; they call for one-way delivery of information (e. g., instructor lectures, text delivery).	Fax, web, or other technology resource allows one-way (instructor to student) delivery of information (text and/or graphics).	By the end of the course, all students in the class are interacting with instructor and other students *only* when required.
Minimum interactive qualities (2 points each)	In addition to brief introductions, the instructor provides for one other exchange of personal information among students, e.g., written bio of personal background and experiences.	Instructional activities require students to communicate with the instructor on an individual basis only (e. g., asking/responding to instructor questions).	E-mail, listserv, bulletin board or other technology resource allows two-way, asynchronous exchanges of information (text and/or graphics).	By the end of the course, between 20-25% of students in the class are initiating interaction with the instructor and other students on a voluntary basis (i.e., other than when required).
Moderate interactive qualities (3 points each)	In addition to providing for exchanges of personal information among students, the instructor provides at least one other in-class	In addition to the requiring students to communicate with the instructor, instructional activities require students to work with one another (e. g., in pairs or small	In addition to technologies used for two-way asynchronous exchanges of text information, chatroom or other technology allows synchronous	By the end of the course, between 25-50% of students in the class are initiating interaction with the instructor and other students on a voluntary basis

	activity designed to increase social rapport among students.	groups) and share results within their pairs/groups.	exchanges of written information.	(i.e., other than when required).
Above average interactive qualities (4 points each)	In addition to providing for exchanges of personal information among students, the instructor provides several other in-class activities designed to increase social rapport among students.	In addition to the requiring students to communicate with the instructor, instructional activities require students to work with one another (e. g., in pairs or small groups) and share results with one another and the rest of the class.	In addition to technologies used for two-way, asynchronous exchanges of text information, additional technologies (e. g., teleconferencing) allow one-way visual and two-way voice communications between instructor and students.	By the end of the course, between 50-75% of students in the class are initiating interaction with the instructor and other students on a voluntary basis (i.e., other than when required).
High level of interactive qualities (5 points each)	In addition to providing for exchanges of personal information among students, the instructor provides a variety of in-class and outside-class activities designed to increase social rapport among students.	In addition to the requiring students to communicate with the instructor, instructional activities require students to work with one another (e. g., in pairs or small groups) and outside experts and share results with one another and the rest of the class.	In addition to technologies to allow two-way exchanges of text information, visual technologies such as two-way video or videoconferencing technologies allow synchronous voice & visual communications between instructor and students and among students.	By the end of the course, over 75% of students in the class are initiating interaction with the instructor and other students on a voluntary basis (i.e., other than when required).
Total for each:	______ **pts.**	______ **pts.**	______ **pts.**	______ **pts.**
Total overall:	_____ **pts.**			

Figure 2. Rubric for Assessing Interactive Qualities of Distance Learning Courses

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Futuristic Strategies for Designing and Implementing World Wide Web Presentations

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This presentation is designed for people who intend to create and implement pages for the World Wide Web. The techniques and methods presented can be applied not only to create an informative, engaging presentation but also to maintain such a presentation. Emphasis will be placed on four key players involved in the design process: presenters, information stewards, designers, and Web site users. Techniques and methods that lead participants step by step from conception of a project through successful design will be presented.

Online Resources for ESL/EFL Teachers and Students: An Approach to Organization and Structure

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This paper discusses the structure and organization of ESL websites and online educational resources. The design, implementation and initial evaluation of the online teaching/learning resource system that is provided through the Distance Education ESL Endorsement Program's (DEEEP) website are presented here.

Introduction

With the rapid and massive transformation of global informational resources into electronic format and their easy accessibility through the Internet, the daily growing number of users begins to feel overwhelmed with the abundance of information on the Web on any imaginable topic. We now face an increasingly complicated and time-consuming problem of searching and selecting specific information, and we need high-quality, relevant pages in response to a particular need for certain information. We are now in a paradoxical situation in the online education: the more information opportunities we obtain through the Internet, the more difficult it becomes to make use of them. This problem urgently calls for two important solutions: first, to rationalize the Internet navigation through developing new search engines, and second, to effectively organize the online resources and websites themselves, particularly those that offer special information and services. The group of authors under a collective name Members of the Clever Project in their article Hypersearching the Web (1999) focus on the first issue.

To a great extent this issue concerns web-based educational and professional development sites. It is evident that the outcomes of Internet teaching/learning resources' use and online education in general to a great extent depend on the efficiency of their search and selection, on the one hand, and on the relevancy and structure of informational resources that should be available in a "well-organized form" (Romiszovski 1997, 27), on the other. We would like to share our approach to the second issue of organizing and structuring the educational resources using our experience in creating the DEEEP website. DEEEP (Distance Education ESL Endorsement Program) is essentially a professional development program for the teachers of English as a Second Language (ESL) in Utah.

What are the Educational Resources?

educational resources" (ER) itself that, in our understanding, means *an organized and structured collection of relevant information, texts, courseware, and other educational materials available in various formats and used for teaching, training and learning*. As we deal with the online ER here, it is presumed that they all exist in electronic formats allowing them to be transmitted through the Web, so we also use the term "*electronic educational resources*" (EER). We feel that in dealing with the current phase of EER development it is premature to talk about a system of online resources, however it might be a goal in developing an individual resource database. Anyway, it is essential that this collection is organized in some rational way to provide an easy and efficient access to all the resources. The structure of the ER has to reflect its purpose: is it for teachers or learners; is it offered through a college or a business website; is it used to provide accredited distance education, some stand-alone web-based courses or other educational services (e.g. texts, exercises and advice for independent learners), or does it serve as a students' resource facility developed by a school to provide in this way online support for traditional campus-based, face-to-face education; is it an organized and well-structured system or just a random assortment of various materials for self-education; is it maintained by an organization or an individual enthusiast; and finally, is it comprehensive (inclusive) and self-sufficient or just a liaison listing the links to other sites.

Resources Online

In (Members of the Clever Project 1999, 54) the authors single out two types of Web pages: 'authorities' and 'hubs', the former being the best sources of information on a particular topic, the latter collections of links to those locations. This is a general subcategorization of the websites that reflects the major distinction between them. Our research of online ESL/EFL resources showed that all existing websites that contain EER can be divided into 3 groups depending on the scope of educational services they offer, and their inclusiveness: 1) *comprehensive* – provide a whole range of educational products and services, from online courses to related links (e.g. ENGLISHTOWN, GlobalEnglish, Peak English, English Online at The New School, etc.); 2) *supportive* – offer a variety of educational products and services, like materials for teaching/learning, chat, links, etc. (e.g., Dave's ESL Café, NETEACH-L, The Linguistic Funland, ESL House, etc.); however, they do not support any regular established training and follow-up; 3) *intermediary* or *liaison* – only point out to the sites that are associated with the topic and give their links to them (e.g. TESL/TEFL/TESOL/ESL/EFL/ESOL Links, US State Department's Office of English Language Programs, etc.). As we have discovered, very few sites offer online courses, some provide materials for reading, writing, grammar, vocabulary, pronunciation and other skills development, as well as relevant links. A few sites provide a communicative function offering Bulletin/Message Boards, discussion, or chat (e.g. Dave's ESL Café, SUNY Gopher). There are also promotional sites that advertise their products but do not offer any online materials or support (e.g. World English). It takes time for the user to get oriented in this immense and unstable sea of information, for you do not know which site offers what you need, or what information is reliable and what materials are of good quality; sometimes the information and links on the site are not well organized, often some links quoted by the sites are already dead, etc.

It becomes more urgent that the sites need to be updated and evaluated (Kirk, 1996). There are two most ordinarily used criteria for evaluating the site: the number of hits, and the number of references to the site. An expert evaluation approach can also be used: a group of experts may be asked to evaluate the organization, structure, content and format of the websites in each specific area, e.g. ESL/EFL links may be checked once in a while (once a year?) and the results of such an evaluation will be made public thus serving as a guide in the multitude of Web sites. The question is, who will be able to undertake such a venture?

Clear information representation in the website and easy access to the resources facilitate the user's ability to find and process the available information and materials. The degree to which the user/teacher can access and manipulate those resources should be increased through better structuring and organization.

As the majority of websites are designed for the random individual users, its structure is determined by the willingness and capability of the designers to cover as many topics and items as possible. The ensuing effect is the overloading of the home page. The overload, naturally, hinders the effectiveness of the search, evaluation and use of the resources. The specialized sites that provide certain services, e.g. accredited training and learner support, are more narrow and focused.

A typical ESL website includes, as our analysis shows, the following components:

Schools: universities and colleges offering ESL programs
Organizations: professional or other organizations
Distance Learning (classes): complete courses, separate lessons and various materials for learning
Resources (teacher's and/or learner's): lesson plans, activities, exercises, texts, poems, dialogues, songs, idioms, slang, quizzes, games, tapes, videos
News: news, announcements, newsletters, e-magazines, current events and happenings, and conferences
Communication facility: bulletin board, (discussion) forum, chat, message exchange, mailing list, teacher/student email

Books section: online libraries, bookstores, publishers, books, textbooks, journals, articles and papers
Support: help (center), guides, hints, tips, advice, FAQ's
Relevant links (classified or unorganized)
Technology: web page creation tips, recommended authoring software, multimedia, programs to download or order
Some sites also give ESL/EFL job search tips and links

As we can see, these areas tend to cover all the issues that an ESL teacher might be interested in. However, few websites provide EER for the ESL teachers' professional development (PD) and full-scope support for classroom practices.

Distance Education ESL Endorsement Program (DEEEP)

The DEEEP program was developed in 1998 as a partnership project among the University of Utah and the six biggest Utah school districts. The purpose of DEEEP is to prepare teachers of all levels (elementary, middle and high) and school administrators to address the needs of the ESL students in their class. These needs stem from the increasing cultural diversity in Utah, which mirrors the processes going on around the USA that are brought about by intensive immigration from various countries. The program offers a choice of two lines: a Master's Degree in either Education or Linguistics and/or an ESL Endorsement. The implementation objectives were to use distance education technology to deliver the program to the sites at local schools, and a collaborative model involving university faculty, school administrators and K-12 teachers in the program design, course development, program management and decision-making.

DEEEP currently offers two PD formats: a three-year program consisting of 8 courses in Education and Linguistics that apply to both a Master's Degrees and Endorsement, and an Endorsement program of two years that consists of five courses: Issues and Research in Multicultural Education, L2 Methodology, Content Based Language Teaching, Minority Languages' Issues in Education, and Materials Development and Practicum. We are presently developing a one-year endorsement program that will include extensive online support. DEEEP is evolving from a traditional "hands-on", one-time training program with tentative technology use into a continuous, Web-based, multifunctional, in-service professional development and support system based on contemporary technologies.

DEEEP Website Organization and Structure

In 2000, DEEEP developed and put online its website. It was designed as an online teachers' continuous professional development and support system that would offer two major types of ER for the teachers enrolled in this program:

1. Resources in ESL/bilingual issues (based on the DEEEP curriculum and courses, and also using outside sources) that can be used in a face-to-face workshop-type facilitator-supported group training and for individual learning through the Internet as a professional development resource.
2. Resources for the teachers' classroom activities.

The structure of the website is determined by its goals. We realized that the teachers in the DEEEP program needed the following:

- Information about the Program
- Access to the courses, course materials and instructor
- Support of their teaching practices in the classroom.

The structure and organization of the DEEEP website meets these needs. It contains information about the Program, about the courses offered for the ESL Endorsement and Masters' Programs (Virtual Campus), the Teachers' Resource Online Library (TROL), a News and Events section, and a Help Desk. The Program part also displays the syllabi, course and reading materials. TROL offers materials for teachers to use in the classroom: curriculum, lesson plans, texts, activities, support materials, and useful links to Utah organizations and institutions (Utah State Office of Education and school districts' websites, and similar programs) The Web site also will provide an opportunity for student communication and collaborative activities. As continuous methodological support is essential for the practicing teacher who may be faced with a complicated situation in the classroom, we plan to develop an automatic Teachers' Expert and Support System (TESS) that would offer the teachers professional advice and practical recommendations for their work. The ultimate goal is to develop a fully Web-based Distance PDS system that can serve both the DEEEP students and the local community of teachers who are not enrolled in the DEEEP program. DEEEP courses will be offered online only to the registered DEEEP students, whereas other resources will be free for anybody.

In the first stage (June – August, 2000) we developed the DEEEP website informational structure. In the second stage (September 2000 – May 2001) we are filling it with content and resources. DEEEP Website address: www.gse.utah.edu/DEEEP

DEEEP Online Educational Resource System

TROL is an essential part of the DEEEP Website. It is organized so as to provide maximum support for the teacher in search of the needed materials, information and advice.

There are various formats of the online resource organization: menu, table, scroll, map or chart. One of the most efficient, in our view, is the hierarchical organization of the resource website: from the more general topics to the more concrete. In the development of the DEEEP website we applied this principle: The first level was presented on the home page - we had only seven main items in the menu that hyperlinked to the chapter homepages (second level). Each chapter had its own menu that took the user to the third level where, actually, the access to the materials proper started. However, we found out that we needed the fourth level that provided the necessary detailing of the materials. From each page of the subsequent level the user can return to the previous level as well as to the main homepage.

Here is the chat of the DEEEP EER system that is intended primarily for the schoolteachers who need support in solving ESL problems. We named it TROL (Teachers' Resource Online Library). Students can find the resources for themselves there as well.

TROL

Teacher's Site				**Student' s Site**	
Professional Development		**Teaching Resources**		**Learning Resources**	
1. PD Programs & courses	**Self-study materials**	**Curriculum & lesson plans**	**Teaching materials**	**Online courses**	**Self-study materials**
2. Reference materials	**Expert support**	**Reference materials**	**Expert support**	**Reference materials**	
			TESS		**Live Expert**
3. Communication)		**Communication**		**Communication**	

There are 2 major parts in this system: the *Teacher's* and the *Student's*. The former is divided into two chapters: *Professional Development Resources* and *Teaching Resources*, the latter contains *Learning Resources*. Each of the three chapters has an index page.

The contents of each chapter have three levels: 1. *resources* (programs/courses and materials for teaching or self-study), 2. *support* (reference) level and 3. *communications* level (BBs, discussions, chat and conferencing),

The *Teachers'* support level also includes *Expert* modules that havve two implementation forms: an automatic expert system TESS and live expert service. Other *Reference* modules include encyclopedias, dictionaries, links to other reference sites and materials, etc.

Each individual part is a module of the system. The modules and items within them can be hyperlinked and be used for creating new structures. This assures structural flexibility of EER and their more efficient use.

Organization of the Resources

The resources in this website are organized around several principles, the major one being adherence to the core curriculum, then content areas, levels, structure of the resources, and their format.

The ESL ER offered through this website are divides into two parts:

ESL Issues

Across the Content Area
Language

Content Area
Issues and Strategies
(Math, Science,
Lang. Arts, Soc. Studies)

Linguistic
Issues and Strategies

Cultural
Issues and Strategies

The teachers' and students' EER are structured in this way:

Teachers'	Students'
1. Curriculum	
2. Lesson plans	
3. Teaching materials	Learning materials
4. Classroom activities	Home assignments and tasks
5. Support materials	Support materials
6. Lesson organization and management	Tips for self-study

Each material is ranged according to six different levels of education: K-3, 4-6, 7-9,10-12, college, other.

All the EER in TROL are arranged according to the following major formats:

- Text-based Materials:
  - Textbooks
  - Other (texts, poems, songs' lyrics, tongue-twisters, idioms, etc.)

- Audio-based Materials:
  - Audio courses
  - Other (phonograms of the texts, dialogues, poems, songs, etc.)

- Video-based Materials:
  - Video courses
  - Other (video clips, movies, documentary, etc.)

- Computer-based Materials:
    - Computer courses
    - Other (computer games, learning programs, software for teaching/learning, etc.)
- Web-based materials:
    - Distance courses
    - Other (online teaching and learning materials)

The materials in each group may also include activities and tasks (problems, exercises, cases, etc.), and reference materials (encyclopedias, dictionaries, reference books, etc.)

Evaluation

As the DEEEP website and TROL are still in the developmental stage, we have not yet been able to evaluate them. However, based on the feedback from the DEEEP facilitators and students, as well as from the colleagues, we have grounds to believe that this organization and structure of the online ER will be advantageous to the users – schoolteachers who need continuous, updated, effective pedagogical resources for their productive classroom activities and professional growth.

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Telementoring Beginning Teacher Researchers

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Abstract: This study examines the daily processes that occurred as a telementor worked with a group of beginning high school teachers on their classroom inquiry projects. It outlines the basic issues that were confronted during this project: motivation and involvement, what kinds of advice to give, which tools to use, and how to help teachers find answers within themselves. This study contributes to the knowledge base concerning the issues that telementors might face and suggests further areas that might be explored.

Introduction

Qualitative forms of classroom-based inquiry such as teacher research (http://gse.gmu.edu/research/tr/) have been gaining credibility and popularity among educational practitioners. With the development of new technological tools, we now have additional opportunities to begin linking teacher researchers together across distance and time (Shafer, 1999). At this juncture, it is important to look closely and carefully at what actually happens when experienced teacher researchers mentor beginning teacher researchers. How might the work of beginning teacher researchers and the school-based change initiatives they are exploring be supported?

During the 1999-2000 school year, I served as the university-based mentor for the George Mason University Language Minority Teacher Induction Project (LMTIP). Along with two school-based teacher mentors, we supported a group of seven beginning teachers who taught in a high school in the District of Columbia. During the first half of the school year, the teacher mentors focused on building community among the group of new teachers. They gave advice and support on how to navigate the bureaucratic processes and daily routines of their school. During the second half of the year, the focus of the group shifted to classroom inquiry projects.

Induction training that involves classroom-based inquiry projects is important because as Brown, Collins, & Duguid (1989) point out

> the activity in which knowledge is developed and deployed, it is now argued, is not separable from or ancillary to learning and cognition. Nor it is neutral. Rather, it is an integral part of what is learned. Situations might be said to co-produce knowledge through learning and activity. Learning and cognition, it now possible to argue, are fundamentally situated (Brown, Collins, & Duguid, 1989, p. 32).

One of the goals of the LMTIP was to find ways to help beginning teachers develop connections among the theory they had learned in their graduate coursework and the practical realities they faced each day as they taught.

Besides supporting the two teacher mentors as they worked with their group, my role (or so I thought) was to my six years of experience conducting teacher research as a classroom teacher as I worked directly with the teachers as they conducted their classroom inquiry projects. However, because of scheduling conflicts, I could not attend every one of the bi-weekly meetings at the school. I needed to find an alternative solution for mentoring the teachers.

The study

While I had read descriptions regarding others' attempts at telementoring such as Spitzer, Wedding, & DiMauro (1994), I still was not sure how the process might unfold for me. I decided to do my own inquiry project on my experiences, using the teacher research process to do a study on my experience.

As part of this study, I looked at my research question from several angles, collected data and reflected on that data, and triangulated it with others' perspectives and a variety of evidence (MacLean & Mohr, 1999). As a result of the first casting of my research question, the layers within it were

First question cycle

I. **What** happens when teachers use email to talk about their teacher research projects?
II. **How do** teachers get motivated to use email to talk about their teacher research projects?
III. **What** kinds of email conversations (or events in their lives) lead teachers to use email to talk about their teacher research projects?

As the project developed, I recast my question to examine it from a different angle:

I. **What** happens when I give advice to teachers on how to do classroom inquiry projects?
II. **How** do teachers use that advice?
III. **What** kinds of advice are more effective?

At the end of these two question cycles, I poured all of the written data (51 emails from the researcher; 38 email replies back; and 18 journal entries) into NVivo, a qualitative software program, and analyzed it for underlying patterns. I used coding analysis and connecting analysis techniques (Maxwell, 1996) to organize my data into chunks of text that contained recurring themes and to look for the connections among those themes. The four topics that emerged during this analysis centered the following themes:

- **Motivation and involvement**
- **Advice**
- **Tools**
- **The validation of the production of local knowledge**

Findings

Motivation and involvement

When I had first suggested to the seven teachers that I wanted to try to use email to help them with their projects, they had responded enthusiastically. I divided the teachers into three groups of two, two and three teachers. I hoped that by using groups, they would be under less individual pressure to respond to every one of my emails if their schedules became too hectic. I chose email because I wanted to use a communication tool that would be part of their daily routines—and since most of them check their email every day or so, it seemed that there would a higher likelihood of them using it.

I began by sending out regular emails to each group every Wednesday and Saturday. Yet after a month, I had grown frustrated and worried over the fact that I was only getting sporadic replies. I became worried that, if this trend continued, their projects might progress so slowly that they would not have explored their questions enough to be able to write about them at the end of the school year.

Several factors may have played a part in the initial low level of involvement. First of all, teaching is quite time-intensive and demanding. One teacher finished one of his emails, commenting, "Right now I am blank again. Talk about being fried. My brain does not want to function anymore." Another factor may have been that the teachers were getting enough support from the face-to-face (F2F) bi-weekly meetings. Those meetings had both oral and written sharing times. It may have been easier to not participate as much in less contextually-rich interactions such as email when it is easier to get a higher-context interactions in a F2F meeting. The added task of writing emails to me may have been one more task to add to their already-too-full lists of things To-Do.

Perhaps the beginning teachers had too many options for support? Perhaps it was easier to focus more on participating in the F2F on-site meetings than doing the online activity? In this light, the online support I offered may have been a bit superfluous. One important aspect of online telementoring is to find out what kinds of on-site support might also be occurring.

In the end, what seemed to motivate the teachers to contact me and spend more time on their projects was the final deadline. In June, they would need to submit and share their final project at a conference with the fifty other teachers who were part of the LMTIP. In mid-March, Rob captured this sentiment when he ended his email with the comment, "I feel my clock ticking..."

Yet what *did* work well with the telementoring approach that I was using? When I looked more closely the teachers' response rates, I found that, except for one of the seven teachers, I was only getting scattered responses to my emails. Why were any of the teachers writing back to me?

One teacher's reply showed one of the advantages of using email. For him, it was a private way to ask additional questions. Rafael began one of his emails with the following paragraph:

> Date: Mon, 7 Feb 2000 18:40:55 -0800 (PST)
>
> Well, here goes nothing. I am still unsure about what my research question should be or should focus on. To be perfectly honest, I don't know what I am doing at all. I was feeling a little embarrassed to bring this up with the entire group. Currently there are some issues occupying my mind....

In this regard, it seems that the choice of communicating via email seemed much more useful because it was more private than, for example, using an asynchronous discussion board.

Advice

Yet, Rafael's response rate was intermittent. One other teacher, Naomi, corresponded with me regularly. What was she doing in her emails? Naomi seemed to approach her inquiry project differently than the others. When she began her project, she did not begin by focusing as much on the steps of the research process. Instead she spent more time reflecting on what was happening in her classroom. It seemed that she used her emails as part of an ongoing dialog with Rob, the other teacher who was part of her email triad, and myself. As she talked to us, her emails seemed to be a way that she could *give advice to herself.*

> Date: Wed, 23 Feb 2000 20:00:46 –0500
> Hi all -
>
> I think I may have found something. There is one student I have in my Intermediate ESL Reading Development class. She is always there (good attendance) and participates, and adds to discussions, and seems to genuinely try hard, but she is very disorganized, and often fails to complete and turn in assignments, although she seems to know the information. I noticed her good intentions but extremely messy backpack and papers. Her papers from her different classes were sort of wrinkled and crammed together in various spiral (without pockets) notebooks. She rarely knew where any specific paper or assignment was. When her name has come up with at least one of her other teachers (and I know the others so I can talk with them), he rather shook his head with half a chuckle and half a moan and said, "Oh yes, ________. I know her.... I would be interested to see if helping her (and some peer tutoring) be more organized would make a difference in her performance and achievement overall. I have helped similar students get organized once and then usually not checked on them again. I wonder if some one on one attention and consistent help with organization and study skills can help her (and students like her) in my class and across the board. I could check in with her teachers from last semester, look at her grades and progress reports, and also speak with and check in with her teachers from this semester (and that way measure progress), and perhaps make contact with the family. I have just seen so many people say (about other similar students) that it does or doesn't make a difference to work with and pay attention to these things.
>
> So, that is what has grabbed me - it grabbed me before I even considered it for a research project. What do you think.
> Later,
> Naomi

When I compared her final project to the Teacher Research Continuum Ratings Scale (Shafer, 2000), it seemed that the reflective writing Naomi had done had helped her to reexamine the assumptions she held about her teaching practices—one of the key aspects of qualitative classroom inquiry.

However, in retrospect , I can see that the advice that I offered on the actual steps of the research process was not clear enough. Before my study had begun, I had assumed that it would be important for me to provide technical advice on how to actually do some of the techniques related to teacher research. I also wanted to give real-life examples of how to conduct an inquiry project. At this point, I wondered if the examples I used from my own parallel project to exemplify the steps were helpful insights or just a distraction to them? So often, a mentor's first impulse is to tell his/her own story rather than focusing on the other's story first and foremost. That seems to be what I had done. At the end of this study, several teachers told me that my initial technical advice about how to cast a question and collect data on it had been helpful and interesting, but that it was too indirect in how it was delivered.

Tools

When I had begun this study, I had assumed that I would be able to help these new teachers just by using email. However, when I gave a survey to the teachers as part of my data collection, Rob commented that "the emails need to feel more like a dialogue." Bakhtin (1986) suggested that no utterance comes from out of the void, but relates to that which came before it (Bakhtin, 1986). Cobi, one of the teacher mentors, built on this idea when he made the following observation in an email to me. All of these comments helped open my eyes to the importance of these dialogs.

> Date: Sun, 20 Feb 2000 09:08:09 EST
>
> You say [in the email you wrote last time] that e-mail is a lot more conducive to thinking. I suppose that conversations are more spontaneous and interactive and less reflective, but people are also talking to themselves in those conversations as much as they are talking to the others in the room -- just as we are when we e-mail. It's always interesting to see people's wheels turning as they consider new ideas in the conversations.

The advice that Naomi was giving herself did not take place in a void, but was situated within an ongoing conversation. The challenge for was to tap into the dialogs that were taking place at the school and continue them in our email conversations.

Both comments led me to reexamine my use of email as my primary communication tool. It left me too far out of the loop. It occurred to me that I needed to offer the teachers many different kinds of tools and interactions, not to limit myself to one style. At this point in the study, I began to explore the kinds of tools and interactions that might support the development of these dialogues.

In light of what I was learning about the power of giving advice to one's self in order to reveal one's assumptions and the importance of situating this advice within a dialog, I began look for other kinds of strategies that might offer these two elements. I attended a presentation by Marino Alvarez of Tennesee State University. He described how he was using concept maps as part of the Explorers of the Universe Project. University-based researchers were holding asynchronous dialogs with high school students in order to help them to organize their own thinking for their high school science research projects (Alvarez, Burks, Sotoohi, King, Hulan, & Graham, 2000).

I wondered whether I might use concept maps in a synchronous interaction, as part of individual, F2F conferences? During the conferences I would use guiding questions that focused on the teachers' assumptions about their teaching practices. As the teachers talked about their projects, I would record and map out what they said. Afterwards we would both go over the map and try to draw connections between the assumptions and the instructional practices that they were putting into practice—both of which they had just described to me. My taking over the writing aspect of the task, I would free up the teachers to think and speak about their question—and still be able give them record of what they had said when we were done.

As these individual conferences progressed, I noticed how different they were from the asynchronous interactions we had conducted via email. On April 13, I wrote

> I realized that when we're doing these F2F synchronous conferences, we needed to *hear* the sound of each other's voices and have super-fast writing tools. I wrote so quickly across each page as they each were talking. There was also a strong emotional component to these conferences. We had the ability to look at each other directly and read facial cues. We had access to 3-D supplies to support the conversation…. The technology just is not there yet. For now, I would need F2F meetings to get this rich type of exchange.

Even a chat room exchange would not have captured the energy or layers of information that exchanged during our meetings. For the time being, online synchronous interactions still do not reach the depth of F2F synchronous interactions and therefore, limit the amount of information and context that is available to the participants. Written dialogue does not offer the free flow of thought or interplay that oral dialogues have. There seemed to be a strong affective quality to our conferences. One teacher, My-Ling, later used what we discussed during her project as the central frame for her final written project (George Mason University Language Minority Teacher Induction Project, 2000).

Advice (revisited)

I looked more closely at the advice that My-Ling had given herself during our conference. It seems that the F2F synchronous meeting was useful to her because, as she was describing her project to me, she was showing changes in the underlying feelings and assumptions that she held about her instructional practices. She demonstrated emotions such as frustration, confusion, surprise, and happiness during our talk together. Looking back, I can see that there was much more of an affective (AHA!) component in our F2F conference than in our email exchanges.

My-Ling described how surprised she felt when realized that she was spending so much time on making her math lessons fit the progressive methodologies that she had learned as part of her teacher preparation program, when, in contrast, her immigrant students kept telling her that they were more comfortable with, what she described as, traditional forms of instruction. She wondered if she had been asking them to make too big of a cultural leap too soon after their arrivals to the United States. As we went over her map, she saw how her underlying beliefs were telling her one thing, while her students were telling her another thing. In the end, she decided give her students more of a balance between traditional and progressive styles of instruction so that the students might use learning styles that fit their cultural backgrounds and gradually acculturate themselves to the more progressive forms of instruction that they might meet later on in the mainstream classroom (Delpit, 1988).

Validating the production of local knowledge

When I began this study, I assumed that the teachers would quickly take to the idea of searching for their own answers to their problems. Throughout my study is seemed that the teachers were having difficulty accessing their own prior knowledge regarding the instructional challenges they faced.

It seems that, from the very start of the project, the beginning teachers saw knowledge and expertise as residing in others or in research books and articles, but not as much in themselves. Granted, they were new to the profession, yet I found it interesting to listen and watch as they used the dialogs that they had with the teacher mentors, each other, and myself to reveal to themselves how they might approach their instructional problems. I recorded one example of this in my journal in mid-April.

> During our conference, Hans commented, "I need some articles." "Why?" I asked him. "What specific things that you've seen in your classroom do you want to check out?" "Well, I need to find which strategies I should use…" he replied. Then he proceeded to recount all of the strategies he remembered from his coursework at a local university. "I might use this strategy or I could use that
> do you need more articles for when you've got the stuff in your head? You just need to organize it and then try it out to see if it works." "That's the next step?" he asked. "That's the next step," I replied. "What do you think you might do tomorrow?"

Conclusion

I learned during this project that, even before direct advice on the steps in the research process can be followed, it is important for teachers to either write or talk reflectively about their questions and to begin identifying their underlying assumptions regarding classroom instructional practices. In the future, I would like to look more closely at how to effectively use online communication to convey the actual steps of casting questions, gathering data, triangulating evidence and other technical aspects of teacher research. Beyond that, it seems that the reflective dialogs we held as they focused on classroom inquiry projects were useful in helping the teachers to make connections between theory and practice—at the same time as they also helped teachers to think more for themselves.

In the future, I would also like to explore how to combine asynchronous and synchronous tools to get the best of both of these types of interactions. As Dede & Kremer (1999) point out, most subject matter has the potential to be understood better with a mixture of media. Perhaps we are limiting ourselves when we use one medium. Perhaps, we might use synchronous interactions to get those synergistic leaps of thought and to increase motivation, while using asynchronous interactions to promote reflection and to fit in with teachers' busy schedules. Because the telementor cannot always have the luxury of F2F communication, more research needs to be on how to expand our repertoire of communication tools.

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From Email to Virtual Reality: An Online Master's of Education in Educational Technology that Models Interaction

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Abstract: This paper addresses how Northern Arizona University (NAU), an institution that serves mostly rural students in Arizona, created and implemented a totally online Master's of Education in Educational Technology degree that is based on the constructivist theory, promotes and fosters interaction among students, between student and instructor, and between student and content. A discussion of the fourth type of interaction, interaction with the technology interface, is also addressed. Finally, the authors talk about how Active Worlds, a three-dimensional, virtual reality environment that allows interaction, is built into the master's program.

Introduction

The last two decades of human history have seen technological advancements with no parallel in previous years. Telecommunications, especially the Internet, have changed the way people do businesses, have leisure activities, and attend to schools. Global networks link millions of users around the planet, and the rate of adoption is growing dramatically (Harasim, 1993). New distance education degrees that use only the World Wide Web as the interface of delivery are flourishing everywhere. In fact, many institutions fear that they will be extinct if they do not offer web-based distance education courses (Roblyer, 1999). This paper addresses how Northern Arizona University (NAU), an institution that serves mostly rural students in Arizona, created and implemented a Master's of Education in Educational Technology degree that is not only totally web based, but that uses cutting edge technology to promote and foster interaction.

Background Information

The Master's of Education in Educational Technology (MED Tech) aims to prepare technology forerunners in PK-12 schools who will (a) exhibit instructional leadership and model the integration of computers and related technologies throughout the curriculum, (b) implement effective solutions to instructional challenges including the design and development of instructional materials, and (c) identify, select, install, maintain, and manage computing hardware and software. Because the mission of this degree is to prepare classrooms teachers to view technology as an integral part of their teaching, focus groups and numerous discussions were held to (a) identify the philosophical framework that would drive the degree, (b) agree on different strands that would run across courses and which would give unity to the program, (c) develop new curricula, (d) get approvals that ranged from in-house committees to the Arizona Board of Regents, and (e) adopt the appropriate interface for the web courses that would ensure not only the seamless delivery of the program, but that would foster interaction among students, between student and instructor, and between student and content.

Review of Literature

As the Internet becomes commonplace, the "school without walls" has slowly emerged and is claiming its niche among the brick and mortar schools in the American educational system. In this kind of school, learning takes place anytime and anywhere when resources found at home, museums, libraries, and universities are woven together to connect learners that collaborate in distinctive new ways to form a community of learners (Spindler, 1995) joined not by geographical location but by common interests. As a consequence, the use of the Internet as a learning space has revolutionized distance education in higher education (Abrahamson, 1998). The segment of the population that embraces online distance education is largely composed of people who need to go back to school either to retrain or to keep abreast with changes in their professions, and classroom teachers are no exception. However, teachers need not only the knowledge base to integrate technology, but apprenticeship experiences that will build their confidence in technology use. To achieve that goal, special care was put to address the different types of interaction that research suggests are best practices in distance learning.

Moore (1989) described three desirable types of interaction in a distance learning setting: (a) learner-learner interaction, (b) learner-instructor interaction, and (c) learner-content interaction. The result of all of these types of interaction is the sharing of ideas, concepts and valuable feedback. The implication for educational practice is that collaboration and group interaction should be actively supported to promote learning (Teles, 1993). To support such interaction, each course in the MED Tech program has the following components: a web site for course content, personal email capabilities, course listserv that sends messages to all class members at the same time, bulletin boards, and chat rooms. Although all tools overlap in their target interactions, it can be said that bulletin boards and chat rooms support the student-student interaction, personal email and listserv the student-instructor interaction, and the web site for the courses the student-content interaction.

Yet, there is a fourth type of interaction in distance-learning environments: the technology interface for course delivery. As Norman (1993) discussed, technologies are never neutral. They impede some actions and aid others. Hillman, Willis, & Gunawardena (1994) explained that learners also interact with the technology through the course delivery interface. The MED Tech uses *Course Tools in a Box, WebCT,* and *Blackboard* as the technology interface. In *WebCT* and *Blackboard*, students use the bulletin board to discuss readings and post assignments, chat rooms to discuss and agree on group work assignments, have synchronous communication with the instructor during virtual office hours, and as a forum for guest speakers for the course. Quoting Norman (1993), we can say "appropriate tools are designed by starting off with human needs, working with those who will be using the tools to fashion them into the most effective instruments for the task. Above all, such tools allow people to be in control: This is an appropriate use of an appropriate technology" (p.252).

Virtual Reality

As part of promoting interaction in the MED Tech courses, yet another avenue for interaction has been added to the program. *Active Worlds,* from Eduserve, is a three-dimensional world that takes interaction a step closer to reality. In this graphic-rich, game-like world, students can walk, talk, wave, and even dance. To perform all these activities, the students choose an avatar. An avatar is a graphic representation of the person and it can be human-like, insect-like, alien-like, or any other form that the creator of the world wishes to design. With a fair amount of sophistication, the student can even create his/her own avatar and add the features he would idealistically have. There are perceived advantages and disadvantages to this medium, though. Some researchers state that working in three-dimensional worlds makes it easier for students to interact with one another and brings a human touch to the distance learning experience, while others argue that this type of interaction is too much of a distraction for a student (Young, 2000). One thing is certain: these three-dimensional worlds are on the cutting edge of technology and there are no studies that report on the perceptions, consequences, and advantages of using them. All what is learned in these first endeavors will constitute the seed for future research.

Conclusion

Web-based instruction is still a new field and much needs to be researched to understand its intended and unintended consequences. Although many degrees that use the World Wide Web have flourished, not all of them take this endeavor seriously enough to have the same or more rigor and interaction than a face-to-face learning experience. The Master's of Education in Educational Technology from NAU has been designed to address interaction at all levels. Because technology is not neutral, special attention has been put on using interfaces that are aligned with the program's goals. Lastly, the use of virtual reality for interaction brings a new dimension to this degree and opens the door for unforeseen possibilities in the arena of distance learning.

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Camp Internet Distance Learning Consortium

Current work with advanced Internet Applications in K-12 classrooms, including GIS, Internet delivered video and interactive quiz units along with new reports on advanced Teacher Technology skills training. .

The Education Technology Revolution Challenge

The American education system is in the midst of a challenging revolution as it steps from the 20th century chalk and blackboard environment to the 21st century multi-media electronic networking environment. This transformation has created new teacher professional development needs, and presents new innovative content delivery opportunities. To successfully make this transformation from the blackboard to the electronic classroom, **the national education community must now challenge technology to deliver on its promise of redefining American education practices.**

What is now most needed are new innovative teacher training programs that do much, much more than merely show a teacher 'how' to use a computer this new style of teacher education will help teachers **experience the WHY and the empowering WOW** that educational technology can deliver. This training is not about hardware or software, it is about real applications for the technology on a daily basis in the classroom. And it is fostered most effectively in new innovative distance learning communities that involve teachers, students, and parents in rewarding demonstrations of real, tangible improvements in learning ... and in teaching.

To win this 21st century education technology revolution, schools must now learn to integrate technology literacy skills right into the very fabric of the classroom teaching and learning environment.

We would like to review the **CAMP INTERNET Distance Learning Consortium** as an active
case study of an empowering
Technology Integration Solution

Camp Internet is an innovative project-based teacher technology training and content delivery program that addresses the technology revolution challenge. The Camp program puts Internet-based technology to work to bring motivating reading, science, math, and social studies learning experiences right into the classroom every day, every week, all school year long. The Camp has been successfully training teachers and delivering innovative online content and hands-on projects in California classrooms for since 1994, and has been honored to gain recognition from the Smithsonian Innovation Network, the California Dept of Education Technology Literacy Challenge Grant program, and the USDA Rural Utilities Service Distance Learning and Telemedicine Program.

From a single schoolhouse in a rural community, to large urban districts such as the Los Angeles Unified School District, Camp Internet is demonstrating new ways to integrate technology into the classroom and the community. Currently serving over 4,000 4th to 12th grade students and 15 USDA assigned cities in California (where Camp is made available both in public schools, libraries and afterschool programs).

Camp Internet recognizes the larger, historical significance of this point in the history of American education. This is the juncture when educators deserve to demand that the online technology finally PROVE itself as a learning tool unmatched by traditional print, television, or even earlier computer media. The Camp's consortia of teachers, researchers, and educators are working to develop and deliver a live and online training program, one that establishes a new methodology for promoting teacher skill development and paves the way for the actual integration of the 21st century learning tools right into the very fabric of the classroom.

Camp Internet's greatest strength is that it combines live teacher training with immediate, tangible online classroom applications. This methodology stimulates the teacher's professional empowerment, fosters higher student academic achievement, and helps build supportive parent involvement.

The Camp's distinctive training and content delivery methodology serves as a catalyst that empowers teachers to discover new and *more rewarding uses* for computers in their classrooms by focusing their training goals on highly motivating curriculum enhancement content. At Camp, mastering hardware and software is the not the ultimate goal. Experiencing positive new ways of learning and teaching in a supportive distance learning community is the goal.

We will look at four primary components of the Camp Internet project:

1) Teacher Training
2) Development and selection of curriculum enhancement materials which work easily in nearly every classroom
3) Application of video and gis technologies
4) Creation of a Community of Teachers involved in a shared education and learning process

Let's begin by looking at the Camp Internet Teacher Training program. Designed to empower teachers with new and essential Technology Literacy skills the program works with teachers from throughout California.

Participants attend a 4 day intensive training program . Teachers, Librarians and technology staff work in the lab and in the field.

In the lab Teachers learn to use the video and video chatrooms within Camp by taking part in daily chats with subject specialists who will come online later in the year to work with the teachers classroom in live chat sessions for the whole class. They also learn to use the special online quiz units, the Internet delivered video and audio units which support each study area and they learn to develop web sites for their classroom, web sites which will become part of the upcoming years learning record.

In the lab Teachers begin to review important skills necessary for their students in the coming year on Camp Internet. One of these skills is Dialog. The ability of students to come into a chatroom with a subject specialists (we call them "Trail Guides" but they are University Professors, staff from federal and state agencies, marine scientists and many more, see http://www.rain.org/chats to view the archive), ask meaningful questions and then respond or make use of the answer to their question is important. We have noted over the past five years a continued need to give students the skills necessary to absorb and remember what they do online in a distance learning classroom. Teaching this skill in classic Dialog provides a framework for the students. They enter the chat sessions prepared and come away from the sessions with field reports that reflect actual learning.

After spending a day in the lab Teachers take part in a fieldtrip where they receive instruction in the use of GPS and GIS tools. Camp Internet provides a special Internet Map Server for classrooms to use to develop local gps/gis projects. They visit local Chumash Indian preserves, a Natural History Museum and NOAA's Channel Islands National Marine Sanctuary. At these sites they meet some of the people who will serve as "trail guides" during the coming year.

Following the days field trip teachers prepare Field Reports. These become the first of their many field reports to be filed with Camp Internet as they progess through the year. Digital camers, gps units and computer resources are provided to make it possible for each teacher to experience authoring an online report.

Following the four day intensive training participants take part in monthly online continuing education sessions to expand on what was learned during the training session. This guarantees that along with working with Camp Internet in their classroom daily teachers receive special attention every month to support their technology learning. The in-service online training sessions are archived and have become a source of continuing education for teachers working with technology in the classroom.

After training comes the issue of content to be delivered in the classroom. Camp Internet, http://www.rain.org/campinternet, has been in development since 1994. The Camp has received the Smithsonian Institution Technology Innovation award, two AOL Community Education awards and is currently funded through four USDA Rural Utilities Service distance learning grants and a California Department of Education Technology Literacy grant program. Camp Internet also works with many school districts through private subscription. Los Angeles Unified School District draws on Camp Internet for both classroom content and teacher training.

The Camp Internet curriculum enhancement materials are designed around an "Expedition" model. Content is created through multi-agency data exchange, drawing on content from federal, state and regional agencies. The Expedtions cover curriculum ares from literature and art to science and history.

Interactive quiz and field report activities take place daily via the Internet. Classrooms meet with a "Trail Guide" once a week to explore that weeks study units. The Camp Internet content is designed to work within classroom curriculum requirements. Study units are timed and adjusted to work with both 9 and 12 month school year cycles.

Special GIS and database servers provide students with unique tools for creating journals, building gis datasets and establishing multiple classroom learning projects which can take place via the web site with geographically distance classrooms.

Teachers receive special instruction, if desired, in the use of GIS as a classroom "knowledge management" tool. We have see the introduction of GIS to have a significant impact on science learning as well as student involvement through special projects.

Teachers receive ongoing support, throughout the year. Monthly chat sessions are held with groups of teachers. During their intensive training teachers studing similar units of Camp Internet are teamed up with an alumni (a teacher with a year or more experience working with Camp Internet) as the Team Leader for each team. These groups get together once a month online, meeting with Camp staff and with each other.

We have see from this the beginning of an effective framework for creating "Communities" of educators who are able to work together to expand skills and resources. Camp now has three years of archived sessions that are beginning to provide valuable assessment data. It is our feeling that the Internet provides an essential bridge, linking teachers and other knowledge specialists, together, regardless of location. We have seen this linking lead to teachers teaching each other and helping to empower one another as they take on the complex task of incorporating new technologies into their classrooms.

One of the reasons Camp Internet is funded by USDA RUS as well as Department of Education is because of the significant role 'community' and 'family' level education plays in the design of the Camp Internet program. We recognize the necessity to create online learning centers and curriculum enhancement tools that can be used to create cross-generational learning, to work effectively with highly at-risk students and families as well as directly in the classroom.

Classrooms are assisted in establishing monthly Parent nights. On these nights special interactive activities take place that allow parents to see and experience some of what their students are experiencing in their classrooms. Tremendous results have been see over the past two years with these parent nights leading to a very positive assessment.

Special units of Camp Internet are designed to work with afterschool and library environments. We have found ways to incorporate life long learning content into the Camp program which permit it to be useful in the larger community setting as well as classroom. We have seen students meet at their public library to go online and complete a Camp Internet assignment.

With the millions of dollars being invested for hardware and connectivity in schools across the country, it is now time to demonstrate real, concrete methodologies that integrate technology as a core classroom tool, and that challenge teachers to use the technology to make significant improvements in how they teach core curriculum subjects. Technology holds tempting promise as a trainer-to-teacher, teacher-to-student, and school-to-community education reform vehicle. The Camp Internet project is demonstrating a training and content delivery methodology that helps teachers succeed in making technology deliver on its promise to transform the American classroom environment.

Camp Internet can be visited at http://www.rain.org/campinternet. Use the guest i.d. of : campdemo and the password: islbcsw to visit the special parts of Camp Internet.

Designing & evaluating a powerful online environment to support teachers to integrate ICT into the curriculum.

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Abstract:
Traditional ICT courses for teachers cover the basic skills of operating hardware devices or the key features of software applications, and may provide some examples of appropriate classroom use. Such courses rarely have lasting impact. The knowledge and skills gained on the course are soon forgotten as other priorities take precedence in teachers' working lives.

*The programme we, the **Scottish Teacher Education Consortium**, have developed as an approved provider for the **New Opportunities Fund (NOF) Training for Teachers Programme in Scotland** is designed for lasting impact. It uses the technology it seeks to promote and is capable of delivery online via our website, with accompanying printed and CD-based resources to offer flexibility in the mode of delivery.*

It teaches about appropriate classroom uses of ICT through case studies[1] based on the Scottish primary curriculum, and is designed to engage teachers in problem solving & reflective engagement with issues. The course activities support teachers to integrate ICT systematically into their practice. It is needs driven and differentiated – ICT skills are learned and practised in meaningful contexts, as and when required.

We have developed a metacognitively rich learning environment. Teachers are prompted to identify their learning needs and review their progress regularly, and this process culminates in the development of a personal forward plan. There is strong scaffolding for inexperienced users of ICT, and the potential of the technology to engender collaboration is fully exploited.

The evaluation framework uses teachers' self-assessments and samples teachers' portfolios of evidence accumulated over the course. There are end of unit and end of course evaluations completed by participants online. Focus group discussions and interviews with tutors, participants and others with a locus in the training will supplement this evidence. The first evaluation of the course will soon be completed.

Background

NGfL and the NOF training for teachers

The *National Grid for Learning (NGfL)* is both a structure of educationally valuable content on the Internet, and a programme for developing the means to access this content in schools and elsewhere (DfEE, 1998). Part of the UK Government's commitment to schools is to ensure that serving teachers feel confident and are competent to teach using ICT in the curriculum. The funding to support the training of serving teachers is £230m nationally, with £23m of this going to Scotland. This is available through lottery funding (specifically the *New Opportunities Fund* (NOF)), the timescale being from Spring 1999 until 2002.

The main aim of the training is to raise the standard of pupils' achievements by increasing the expertise of serving teachers in the use of ICT in subject teaching. Two of its key features are a focus on the knowledge, understanding and skills necessary to make decisions about the effective use of ICT in the classroom, and the integration of training in ICT skills with training in the use of ICT in their subject (for primary teachers, this is in Mathematics, English Language and Environmental Studies). At the end of their training teachers will develop an action plan for their future professional development in the use of ICT.

Schools can choose from a range of approved training providers, and a national quality assurance framework is in place. The training is voluntary and is it is suggested that, where possible, it should take place in the classroom so that teachers can try things out as they learn (this will also minimize any disruption to pupils' learning resulting from teachers being released during the school day to attend courses held centrally).

Two criteria must be fulfilled by the school before training can be embarked upon:

- it should have an ICT strategy in place, covering, for example, its policy on protecting pupils from on-line access to undesirable materials;
- it should have an adequate level of hardware available for staff to benefit from the training.

Expected outcomes of the training

The expected outcomes of the training are categorized under five headings:

> *Working creatively with ICT*
> *Evaluating & selecting ICT resources*
> *Monitoring, evaluating and assessing teaching and learning*
> *Developing ICT capabilities*
> *Technical skills and applications*

This categorization is not intended as a teaching order, and it is suggested that the approach should be integrative across these elements. Forty-six competences are specified, for example, in the category of *Working creatively with ICT*:

Have an understanding of the potential, benefits and limitations of ICT to support a range of different teaching and learning strategies:

- *with individual pupils, groups and whole classes;*
- *with a range of abilities, age ranges, subjects and levels as appropriate.*

The following advice is given to schools on the teaching approach (NOF, 2000):

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[1] *ICT in Context: Classroom Case Studies*, produced by the Scottish Interactive Technology Centre (SITC) and the Scottish CCC. Also a set of case studies of ICT use in primary schools developed by the STEC team.

> *Appropriate ICT skills and knowledge are best developed in relation to a 'real' task which motivates the learner. As a consequence of using ICT in a meaningful way the learner will be encouraged to extend their skills and knowledge in relation to more challenging tasks and ideas.*

Investment in infrastructure

Separate funding has been made available by the Government for schools to purchase new ICT equipment. Investment in training should follow closely on investment in equipment. By 2002, the ratio of pupils to modern computers should be established at 15:1 in primaries and 5:1 in secondaries.

Current research findings on ICT in Scottish schools

Stark & Simpson *et al.* (2000, a & b) have conducted a national survey with Scottish teachers and ICT coordinators, designed to elicit their perceptions of ICT in schools, experiences with ICT and ICT skills, and to provide baseline data on the impact of national ICT initiatives. Their general impression was,

> *... of professionals who recognise the importance and potential of ICT as a tool to enhance many aspects of their professional duties, but who were finding difficulty in securing the equipment conveniently within their workplace, and in finding time to acquire the knowledge, practise the skills and integrate the beneficial outcomes into their already complex routines and crowded timetables.*

They found that the uses of ICT associated with electronic communications were not well established in primary schools, for example, only 10% of those sampled were securing opportunities for pupils and teachers to access curriculum materials directly from the WWW, and only 6% were establishing collaborative projects with pupils in other schools using ICT.

The positive benefits cited by the respondents included improved motivation, enhanced learning and teaching, improved communications & access to information, improved efficiency and promotion of independence.

Need for lasting impact

A key consideration is sustainability in relation to both infrastructure and appropriate use being made of ICT in the classroom which keeps pace with the developments in the technology and emerging good practice.

Pedagogical considerations

Infusing ICT into classroom practice

An approach which infuses ICT into classroom practice is clearly called for. In some classroom activities the primary purpose will be to teach the subject content using ICT as a tool, in others the primary purpose will be to teach about ICT using a meaningful curricular context. Many classroom activities will combine the two purposes, attempting to strike a good balance between achieving content-related and ICT-related objectives. We encourage participants to be clear about the purposes of any classroom-based ICT activities, to specify the objectives clearly in advance (both content- and ICT-related), and to monitor the achievement of the specified objectives.

Fostering understanding

It is important to foster teachers' understanding of the potential and limitations of ICT as a tool for learning and teaching; an approach which focuses on skills acquisition alone is inadequate. The course activities create varied contexts for performances of understanding (Perkins & Blythe, 1994, Gardner, 1993) to be demonstrated by participants. Opportunities for shared understandings to emerge are created through collaboration on tasks both within the school setting and between participants in different schools, the sharing of ideas and solutions, and exchange of feedback. These are prompted by the course activities and supported by online tutoring (see Figure 1 below for two examples of activities involving peer interaction).

Task 9:

Preferably with a colleague, make a checklist of up to ten key factors to consider when assessing the suitability of software for classroom use.

Send this list to other participants in your tutorial group.

In the light of any feedback and suggestions from other course participants, revise your list of factors.

Use this fresh list to create a "Software Review Template". Use your template to evaluate an item of software.

Task 10:

Whenever the opportunity next arises, observe a group of pupils closely as they engage in joint planning and carry out an ICT activity. Try to intervene as little as possible.

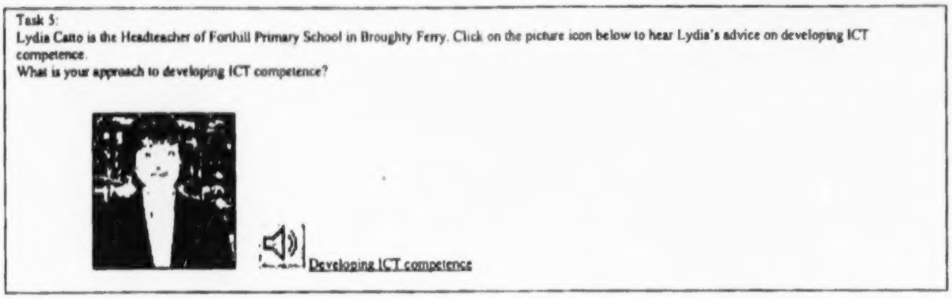
When the activity is finished, ask the pupils to review the activity.

Were you surprised by anything you observed? How well did your observations tie in with those of the pupils?

Share your findings with others in your tutorial group (outline the context first).

Figure 1: Two examples of tasks involving peer interaction.

Reflective engagement with issues enables teachers to develop deeper understandings and thus to reach insightful decisions about when and when not to use ICT in the classroom and how to use it effectively. The issues range widely, from safe use of the Internet, selection of ICT resources, arranging fair access for pupils to equipment and teacher support, to how teachers can best develop their own ICT competency. Case studies in which school managers, teachers and pupils discuss the issues and relate their practices provide a good stimulus for reflection and discussion (see Figure 2 below).



Task 5:
Lydia Catto is the Headteacher of Forthill Primary School in Broughty Ferry. Click on the picture icon below to hear Lydia's advice on developing ICT competence.
What is your approach to developing ICT competence?

Developing ICT competence

Figure 2: A task designed to prompt reflection on issues.

Creating a metacognitively rich learning environment

How to promote self-awareness and self-regulation of the learning process was a key consideration. If this is not developed, and teachers are totally reliant on others to call the next steps, how can they then develop and adapt their practices to take account of advances in the technology, and how can they find creative solutions to the problems and challenges they face day-to-day when attempting to integrate the technology effectively into their classrooms?

Nisbet and Shucksmith (1984, 1986) propose combining direct teaching, modelling of solution processes and developing metacognition as an effective way to improve children's capacity to think and work strategically. The approach can also be applied to teacher's learning about ICT, to improve their capacity to think and work strategically. The key point about direct teaching is that any procedures must not be taught as tricks to cope with specific tasks: teaching must stress the potential for transfer rather than being mechanistic. Modelling involves the teacher (or tutor) sharing with students how his or her own learning, the task and the learning context influence performance. Students should also be allowed to explore their own metacognitive knowledge by discussion and exposure to a variety of contexts or circumstances where it is called into play.

Prompting participants to reflect on their own learning is a key feature of our training. We ask participants to conduct a systematic review at the end of each study unit, by:

- assessing their progress towards specific learning goals;
- planning any further work that is necessary to achieve these goals;
- identifying any problems encountered with the work;
- continuing to review their learning priorities.

Provision of effective scaffolding

Teachers are all at different stages in terms of their use of ICT in the classroom and their understanding of its potential and limitations. For those with the least experience, effective scaffolding must be provided to ensure that they can engage fully with the course activities and gain the necessary experience and insights. This was a key consideration when designing the architecture of our website on which the course materials are mounted. Teachers are learning about the technology through using it within our course, and lack of familiarity should not create an artificial barrier to learning.

One important method of scaffolding within our course is to take participants systematically through the processes of orienting themselves to the task demands and the situation, planning, implementing, assessing & evaluating, leading to application within three different curricular areas and synthesis of the performance of these processes within a 'mini project'. This approach is mirrored in our course structure (see figure 3):

Tutorial units

Unit 1 – Orientation
Unit 2 – Planning to use ICT
Unit 3 – Implementing ICT
Unit 4 – Assessing and Evaluating using ICT
Unit 5 – Using ICT in English Language 5-14
Unit 6 – Using ICT in Mathematics 5-14
Unit 7 – Using ICT in Environmental Studies 5-14
Unit 8 – Mini Project
Unit 9 – Personal Forward Plan

Figure 3: Course unit titles

This is a problem solving methodology which has its basis in Polya's (1948) four stage model of problem solving – understand the problem, make a plan, carry out your plan and review your solution.

Another method is through an ongoing process of needs analysis, which begins prior to participants embarking on the first course unit and uses an online questionnaire. Teachers update their learning priorities regularly as each unit is completed.

Promoting ownership of the learning process

The course is needs driven – participants must reach decisions about the appropriate next steps in learning for them, with the tutor providing guidance if this is sought. The following two short extracts from the materials illustrate the approach (figure 4):

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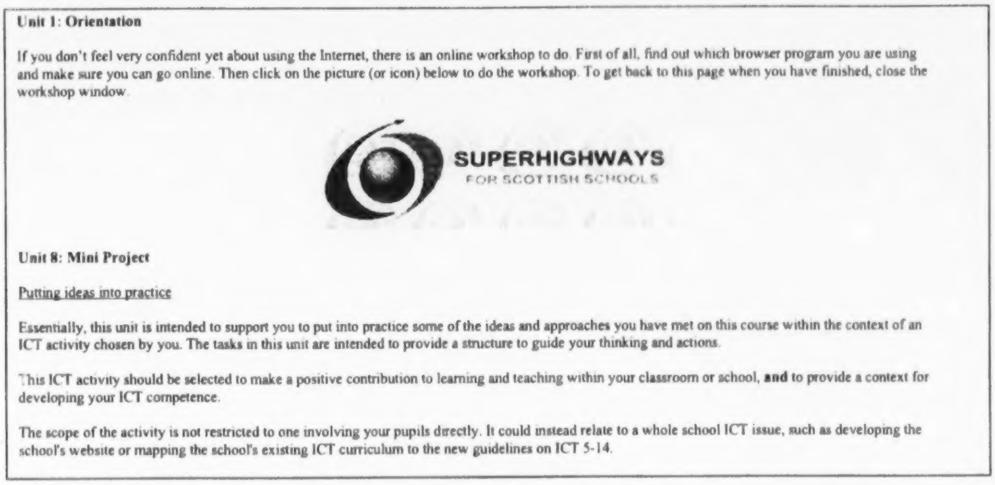

Unit 1: Orientation

If you don't feel very confident yet about using the Internet, there is an online workshop to do. First of all, find out which browser program you are using and make sure you can go online. Then click on the picture (or icon) below to do the workshop. To get back to this page when you have finished, close the workshop window.

SUPERHIGHWAYS
FOR SCOTTISH SCHOOLS

Unit 8: Mini Project

Putting ideas into practice

Essentially, this unit is intended to support you to put into practice some of the ideas and approaches you have met on this course within the context of an ICT activity chosen by you. The tasks in this unit are intended to provide a structure to guide your thinking and actions.

This ICT activity should be selected to make a positive contribution to learning and teaching within your classroom or school, **and** to provide a context for developing your ICT competence.

The scope of the activity is not restricted to one involving your pupils directly. It could instead relate to a whole school ICT issue, such as developing the school's website or mapping the school's existing ICT curriculum to the new guidelines on ICT 5-14.

Figure 4: Illustrating the 'needs driven' philosophy of the course.

This approach promotes active learning and should therefore better ensure that teachers feel ownership of their work to integrate ICT into classroom and school practices. If this becomes established, the prospects for lasting impact are much brighter.

Promoting collaborative & situated learning

The role of collaboration to enable participants to develop shared understandings and to support each other's learning has already been discussed. Many of the course activities relate to actual practices and procedures within the participant's school or local authority (for example, examining school policies or creating a framework for progression in pupils' ICT knowledge and skills) and therefore learning is situated in an authentic context.

Key features of the delivery

Establishing partnership arrangements with local authorities & schools

The course delivery operates through a partnership model, for example, the course tutors may be drawn from schools or from a pool of ICT coordinators within a local authority. Responsibility for the quality of provision remains however with us, the approved provider.

Mixed mode & mixed media

The course can be delivered entirely online, in mixed mode (part face-to-face, part distance) or as a traditional taught course. It uses online resources (our website and external websites), and CD-ROM and printed resources which echo the resources mounted on the website, although for certain activities participants require to be online.

Flexibility

Flexibility is a key consideration for any course aimed at practising teachers. Teachers need to be able to work in different settings and sometimes in short bursts of activity, and at a pace which takes account of their other working commitments. The mixed-mode, mixed-media format should help deliver flexibility, for example, some of the work can be done using the printed resources when teachers do not have access to a computer, or using the CD-ROM when there is no Internet connection. A set of *Record of Work* resources, containing checklists, a diary format, and notes pages listing the tasks, activities & key teaching points, enable teachers to keep track of their progress more easily.

Encompasses NOF teacher competences & specified curricular areas

The forty-six competences referred to in the *Background* section of this paper were carefully mapped onto our nine course units, grouped and conflated, and restated in more direct language as *Purposes* and *Main Aspects of Content* (see figure 5):

Unit 2: Planning to use ICT

Purposes

To enable you to...

- identify when ICT can support learning and plan pupil activities which are stimulating and challenging;
- select appropriate ICT resources;
- decide on teaching strategies and classroom management, ensuring safe use of ICT within your classroom;
- develop your pupils' ICT capabilities.

Main aspects of content

1. Supporting learning and planning pupil activities which involve ICT

You need to look for opportunities to integrate ICT into your teaching.

You need to design learning activities which are appropriate for all of your pupils including those with SEN.

You need to ensure that any learning activities are stimulating and challenging, and encourage pupils to generate their own ideas.

2. ...

Figure 5: Purposes & Main Aspects of Content (from Unit 2 on Planning to use ICT).

Links to Scottish 5-14 national curricular guidelines

There are currently national curriculum guidelines covering ICT (draft), and Mathematics, English Language and Environmental Studies, for pupils aged five to fourteen, which provide reference points for any pupil activities within our course.

The draft ICT guidelines identify seven process oriented ICT strands, as follows:

using the technology
creating and presenting
collecting and analysing information
searching and researching
communicating and collaborating
controlling and modelling
developing informed attitudes.

Evaluation framework

The evaluation framework will use teachers' self-assessments, evaluations of the course units, a sample of their portfolios of evidence, and interview discussions with a sample of tutors, participants and others. A national quality assurance framework is in place.

Teachers' self-assessments

In their self-assessments teachers will have indicated the extent to which each main aspect of the content within a unit has been overtaken and if they plan to do any further work on it (see figure 6).

1a. Look for opportunities to integrate ICT into your teaching plan.

completely overtaken ☐
partially overtaken ☐
not yet overtaken ☐

Comment:

I plan to do further work on this. ☐
I do not plan to do further work. ☐

Notes:

Figure 6: Teachers' self-assessments.

They will have appraised their progress towards personally determined learning goals and perhaps substituted others.

Portfolios

The portfolios should contain resources that teachers have gathered from classroom-based ICT activities (such as examples of pupils' work, teaching plans and worksheets) as well as a written or word-processed record of their responses to the activities and tasks built into the course.

Unit & end of course evaluations (online questionnaires) completed by participants

The end of unit evaluations range across many aspects of the learning environment and learning activities, covering the following areas: interest, relevance, level of demand, clarity of instructions and ease of navigation, time spent on studying, quality of online tutor support, collaboration and communication with colleagues, skills learned, use made of the resources on our website, and overall rating. In addition, the end of unit course evaluation asks:

> Overall, how well did the course address your learning needs in relation to ICT use in the classroom?
> How much do you feel your pupils benefited from any classroom-based ICT activities stimulated by the course?
> Finally, if you have any specific recommendations on how the course could be improved, please indicate these below.

This data will be held on a central database, collated and communicated to tutors and the course design team.

Focus group discussions & interviews

Focus group discussions and interviews will allow a more in-depth exploration of issues and problems, and increase the range of perspectives contributing towards the evaluation. The findings from these sources will supplement other findings and will enable the data to be triangulated.

Implications

Need for greater realism in national planning

It has become very apparent from the slow rate of uptake of the training that it is very difficult to reconcile a voluntary programme of training, which may require teachers to study in their own time, with the requirement for them to overtake a very extensive set of competences. There does not seem to be any easy way to resolve this difficulty unless there is a further injection of funding to provide cover costs for schools to release teachers to study during the school day and/or the competences are revised. Furthermore, the extensive nature of the competences is likely to discourage those teachers who are already technophobic, and may result in a 'surface skim' for those who do opt into the training, rather than any serious engagement with the key issues and the development of real competence with using the technology in the classroom. Not all of the defined competences are of central importance to using ICT effectively in the classroom, and this makes it harder for teachers to discern where their real efforts should be directed. As Gardner (1993) would say, less is more!

Need for better coordination of major educational initiatives

While uptake of the NOF training has been slow in the primary sector, it has been virtually at a standstill in the secondary sector. The implementation of a major curricular reform, *Higher Still*, which affects all S5 and S6 pupils and all secondary teachers, is bound to have had a major impact on teachers' willingness to undertake the NOF training.

While investment in training should follow closely on investment in equipment, this has not in fact occurred in many local authorities. The roll-out of the infrastructure has been too slow, and consequently there is no online access, or only very limited access, for many teachers.

Potential for uneven & fragmented experiences & outcomes

Variability in the format, content and quality of the training offered by different approved providers (some, for example, do not use the technology itself as a delivery medium and some do not address the NOF competences fully), and the uneven situation with regards to technical infrastructure, may result in very uneven outcomes nationally.

The focus on how ICT can contribute effectively to learning & teaching will be sharpened

On a positive note, the NOF framework has shifted the focus on from the technology itself towards appropriate use of the technology, properly integrated into the curriculum and supporting teachers in their day-to-day role.

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Guiding Collaboration to Enhance Procedural Learning

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Abstract: Learning in collaboration has numerous advantages. However, sometimesSituations that damage collaboration arise. This is the case for instance, when students divert their attention from the learning situation at and for a long period of time. New technology can be used to detect and avoid some of these situations that hamper learning in a group. This work focuses on a specific problem "inefficient conversations". The paper proposes the use of a virtual agent to control and guide the students' conversations when learning a procedural subject, namely programming. The virtual agent can play a role similar to that of a human monitor with the additional advantage of being always available.

Why is learning to program so difficult?

Programming is a discipline difficult to teach and to learn. Last year of the 339 students who registered to our University's introductory programming course only 131 students presented the final exam, and only 90 of them passed. Programming is a complex skill to learn where even languages designed for the novice such as Basic and Pascal contain many traps for the unwary (du Boulay, 1986). This discipline is complex to learn for two main reasons:

- Programming involves a great variety of subtasks and types of specialised knowledge that are necessary to perform effectively (Pennington & Grabowski, 1990).
- Programming is a procedural discipline which must be "learned by doing". Many students are not used to work in this manner.

Programming differs from other neighbour domains such as mathematics or physics in two ways. First, there are no everyday intellectual activities that can form the basis for the spontaneous construction of mental models of programming concepts such as recursion or variables. Secondly, programming requires of a physical machine whose functioning may not be transparent to the learner (Rogalski & Samurçay, 1990).

Learning to program in any language is not an easy task and programming teachers are well aware of the myriad difficulties that beset beginners (du Boulay, 1986; Rogalski & Samurçay, 1990). Additionally, programming is also a complex subject to teach, in programming there are many abstract concepts like recursion or data structures, and it is difficult to find clear examples to illustrate some of these concepts. Pedagogical strategies advice teaching using real-life examples to make it easier for students to remember and understand them. In programming to explain the abstract concepts with examples based on the real life is very difficult.

New technology can be used to help students develop new skills, such as the abilities necessary to become a good programmer. Students can be assisted by providing them with computerised aids that are designed specifically for the novice (Smith & Webb, 1999). Many systems have been developed to teach programming. It is interesting to note that although novice programmers normally prefer work in labs where they can ask their doubts and get advice from other fellow students, none of these systems were designed to support collaborative learning.

We have developed a system aimed at assisting students learning to program in a collaborative environment. However, although collaborative learning offers many advantages (see Johnson, Johnson & Smith, 1991; Dillenbourg et al., 1996; Dillenbourg, 1999) sometimes situations that damage collaboration arise. An example is "inefficient conversations". We call "inefficient conversations" to those conversations that are not related to the problem at hand and that distract the student's attention. This paper proposes the use of a virtual student or agent to control this negative situation. The contents of this paper are organised as follows, section two describes current tools designed to teach computer programming, section three presents HabiPro a collaborative system designed to train students in programming, this section also describes an experiment performed with HabiPro. Inefficient conversations were detected in this experiment. Section four proposes adding a simulated student to HabiPro in order to control students' interaction and to avoid "inefficient conversations. In the last section, conclusions and future work are presented.

Current Tools for Learning Programming

Several systems have been developed to assist the teaching and learning of computer programming. Frequently, however, these tools are based on an advanced understanding of the language, and they are not really useful to train novices. The next paragraphs describe the main features of four programs designed to teach programming or help students to debug their programs.

Lisp Tutor (Anderson & Reiser, 1985) was built around a model-tracing paradigm. That is, the tutor has built into it an ideal student model, a production -system model of the different ways in which a student should write LISP code, that follows along with the actual student coding a function. Each production corresponds to the student either typing or planning a portion of the function. When the student deviates from the correct solution path, the tutor gives specific feedback and requires the student to try again (from the most recent production firing, not from the beginning of the function). Student errors that have such remediation are referred to as diagnosed bugs.

If the tutor does not recognise a student's input as correct or as a bug, the tutor displays "I don't understand that" and asks the student to try again. These errors, student inputs for which no feedback exists, are referred to as undiagnosed bugs. After entering two undiagnosed errors for a particular input, the student is given the answer that the tutor expected (via the ideal student model) and an explanation of why the answer is correct. Students may also obtain a particular answer and an explanation of the answer at any time while coding a function by pressing an explain key. In sum, there are four actions a student may take that are relevant to each coding-production: entering a correct answer, entering a diagnosed error, entering an undiagnosed error, and typing pressing the explain key. The tutor records each student interaction in terms of the productions that can be expected, the student's input, and the tutor's response.

PROUST (Johnson, 1985) uses an intention-based approach to identify and explain bugs written by beginning programmers. It is an on-line aid for novice programmers. PROUST has been designed to operate in an ordinary interactive environment. The students edit and compile their programs; whenever a program passes through the compiler without errors, it is automatically passed over to PROUST before it is executed. PROUST then analyses the program for non-syntactic bugs.

For each programming problem that the students are assigned, a problem description is prepared, using a special problem description language. Currently these problem descriptions cannot be developed by the course instructor, but must instead be prepared by someone who is familiar with PROUST's knowledge base. The problem descriptions are collected into a library. When the student submits a program for analysis, PROUST retrieves the corresponding problem description from the library. Using the problem description as a guide, PROUST determines what exactly the student's program is intended to do, and how it was intended to do it, identifying bugs in the process. For each bug in the program, PROUST determines where possible what the probable cause is, and uses this information in describing the bug to the student. If the bug was due to a misconception, then PROUST describes the misconception in English.

Proust and Lisp Tutor have two different approaches to automated feedback. The Lisp Tutor 'watches' the student as s/he writes the program and intervenes as soon as the student types in some incorrect code. Conversely, Proust takes a complete (syntactically correct) program and suggest correction to it (Bental, 1995).

Ceilidh (Benford et al, 1993) is a framework which provides computer-based support for course administration and the teaching of computer programming. Ceilidh has the ability to assess student's programs, to provide feedback on their programs and to provide on-line assistance when the student asks for help. In Ceilidh, interactive tutorial help is provided via electronic mail to a human tutor.

Ceilidh environment have been developed to teach languages including C, C++, Pascal and SML (a functional programming language similar to LISP).

Ceilidh presents one exercise to the students. It also presents a file containing a framework for the code. The student edits the framework file to complete the functions. The student can then elect to run the functions s/he has written on tests of the students' own devising and on pre-set test data. When the student is satisfied with the exercise, s/he can elect to submit the program to Ceilidh for assessment. Ceilidh assigns a mark to the program and informs the student. Each student can see the marks s/he has achieved and if the student is unhappy with the mark can ask for help from a human tutor by sending electronic mail from within Ceilidh.

Ceilidh's assessment is based largely on the correct compilation and on dynamic testing. Some marks are also awarded for the style of the program (absence of redundant, correct type signature with each function).

Marking is only of limited use as feedback. If a program does not compile Ceilidh does not offer any extra help.

SOLVEIT (Deek, 1997) combines the process and the tools to support the functionality of a traditional programming environment with a battery of utilities used in problem solving and program development. It provides an intuitive graphical environment complemented by online help and enforces a structured methodology. SOLVEIT consists of six stages. The first three stages are problem-solving stages and the next three are program development stages. SOLVEIT guides the student through a linear process of problem solving.

When people begin to learn programming, apart from reading a book about the language that they are using, and attending courses, if they have access to the Internet, they might join mailing lists, or news and work groups where they can ask question or advice from other programmers. Thus, the students look for the experience and collaboration of other people. This suggests that in programming learning collaborative techniques are often used because students join together to write programs and to take advice about their doubts in a spontaneous and natural way.

Stacey (1995) explained that a tip to debug programs is to request help from other students or teachers. Many times the bug might be a simple spelling mistake, but the psychological set (the phenomenon of seeing what you expect to see) or psychological distance (the ease with which two items can be differentiated) phenomenon prevent us from finding the mistake. On the other hand, other student or teacher can detect the mistake with a quick look at the program as Gerald Weinberg (1998) observed "the human eye has an almost infinite capacity for not seeing what it does not want to see... Programmers, if left to their own devices, will ignore the most glaring errors- errors that anyone can see in an instant. Unfortunately, only Ceilidh allows students to contact other people, in this case a person with more experience, the teacher. In this way students can request advice to the teacher or show him/her their programs.

The next section describes HabiPro (from the Spanish "*Hab*itos de *Pro*gramación"), a collaborative and distributive system designed to help novice students develop good programming habits.

A *Collaborative* System to Learn Programming: HabiPro

HabiPro is a collaborative learning system aimed at helping novice students develop good programming skills. The application was designed to support collaborative learning because of two main reasons: Firstly, when novice students begin to program they usually make several mistakes in their programs. However, it is often difficult for students to find their own mistakes (similarly, when a person writes a paper it is often difficult for him/her to find their own errors). Because of this, in many cases, students prefer to program at laboratories where there are other fellow students working on similar problems. This way they can discuss doubts, interchange ideas or ask for help to find the mistake/s that prevents the program from working correctly. This fact shows that collaboration can be of great help when students begin to create their first programs. Students can learn through the mistakes that their fellow students have made, students are also more motivated to work than when they are programming alone. The second motivation for the system to be collaborative, is of a social nature: Professional programmers usually work in groups, quality control techniques, such as code peer review, for instance, are recognised to be very effective practices. So, it is convenient for students to become accustomed to work in a collaborative environment from the beginning. In this way, they can also learn social skills necessary for their professional development.

Use of HabiPro: HabiPro has three main windows; the chat window, the work window, and the answer window. The chat window enables students to discuss how to solve the problem. The work window displays the problem to be solved. In the answer window students write the possible solutions to the problem. To work with

HabiPro at least two students have to be connected, each student works from a computer and of course, students are able to stay in different geography locations. Each student can write his/her proposal of solution in the answer window, learners have to reach an agreement about the correct solution. HabiPro has a help system that offers two choices, clues and counterexamples.

In order to test HabiPro, an experiment was carried out. Students divided into groups of different sizes were asked to solve the same set of exercises. Each group member used a computer and could communicate with his/her peers via the chat. The chat conversations were stored. Analysing the conversations it was observed that in many cases students talk about topics that were not relate to the exercises, for instance they talked about the football match that they saw the day before. When this type of conversation was brief, it presented no problem, rather, it could even be advantageous in some occasions because it helps to relax the environment and makes students more confortable with the group. But if these interactions continue for a long time they may be prejudicial to the learning process. As Sipusic et al. (1999) claims more interaction among participants in a collaborative learning group would be beneficial for learning, however one exception is if the discourse is mostly off-topic and detracts from the time and effort devoted to learning.

The students were asked to complete a questionnaire after they finished the exercise. To the question: "Do you think that you have learnt more working in a group than working alone?" a majority of students (80%) answered positively, a minority (5%) answered that they did not know it, and the rest of students (15%) answered negatively. Students had to give an explanation to their answers. Most student who said that they did not learn more working in a group complain about the few motivation that their groupmates had, and in many cases (76%) they commented that their fellow students wasted a lot of time talking about other topics.

It is interesting to note that the problem detected "inefficient conversations" is not produced by technology factors, this situation also arises in collaborative leaning without computer. The question is can new technology avoid or decrease the adverse effects of this situation?

Can a Virtual Agent Avoid Inefficient Conversations?

When a teacher monitors a group's activities, students seldom talk about other topics not related to the task at hand and normally they are more concentrated. The presence of a coach or teacher who controls and directs the group can avoid several problems that arise in a group (see Katz & O'Donnell, 1999).

In order to measure the degree in which a monitor influences group dynamics a second experiment was performed. In this case each group included a teacher acting as a moderator. The moderator's task was to intervene when students began to talk about topics not related to the problem, with comments meant to motivate students to continue solving the exercises, such as: "Come on, let's finish the exercises and we can talk after that about this", or giving a clue such as "I think that the solution is 0,2,4". This technique improved the results and students solved more exercises (average of 3.6 exercises more) and used less time than when no moderator was used. The technique of adding a monitor was really useful but it is inconvenient when there are many groups, since it requires one teacher for each group. In order to solve this problem, we decided to implement a virtual student to play the roll of the moderator.

Virtual students or simulated students have already been used in collaborative environment (see Ayala & Yano, 1995; Inaba & Okamoto, 1997). The next paragraphs explain several advantages of using virtual students in collaborative systems.

- A simulated student can play a role that fosters learning. For instance, Webb (1989) found that learning correlated more with the number of times a student answered a question of another student than with the number of times a student asked a question. Suppose one of the students in a pair learning situation is a simulated student. It could ask questions to the human student. Answering the questions should increase student's learning.

- In traditional collaborative work when a teacher has placed students in a group and given them a task, there is little control over the group's interactions because the teacher can only spend a fraction of his/her time with that group. On the other hand, with a simulated student as part of the group, all kinds of pedagogically beneficial interactions can be staged from within the group itself- thought provoking questions can be asked, taciturn students can be prodded to speak, bad ideas can be questioned, small slips can be caught before they have serious consequences, attention can be directed away from areas that are already mastered and onto areas where students are ripe to learn (VanhLenh, Ohlsson & Nason 1994).

- A simulated student has an additional advantage over a real student: a second knowledge: the expert knowledge base. When deciding how to act, it refers both to its "own" knowledge base and to this expert knowledge base. This expertise is necessary for the teacher when he or she guides a small group, so it should be necessary for the simulated student as well. The lack of such expertise in a group composed only of human students dooms it to be less effective than one with a simulated student, in principle at least (Webb, 1989).

A virtual student can also monitor the group and correct misunderstandings or detect miscommunications. Another important advantage is that each group may have a simulated student. This simulated student is available at any time, so students do not need to worry about whether or not someone else is connected is or if the partner is busy.

A virtual student acting as a moderator is even better than a teacher, because when students work with a teacher they often feel more pressure and they are not so comfortable as in a student-only working group. The virtual student can have other additional functions, for instance, to propose a new course of action when the group is stuck. In this case, students can discuss the proposal and reflect on it obtaining significant learning. On the other hand, when a teacher proposes a solution, usually, students do not doubt the information and believe it without reflecting on it. For the virtual agent to act efficiently, it needs information about the group with which it interacts. Two resources are mainly used by the virtual agent to obtain information: First, a group model where the learning evolution and some social aspects of the group are represented. And second, the group's conversations from which the topic of discussion can be inferred. The system has a database containing the words that students normally use to solve the problems. When the system finds in a conversation a word that does not belong to this database, it check if this word belongs to a second database which contains words related to playful conversations. The words are divided in different groups, depending on the group to which the word belongs, the simulated student uses different motivation techniques. If the word is not found in the second database the virtual agent asks a question in order to assess the progress of the conversation.

Conclusions and Future Work

Collaboration can be very useful in procedural learning, more concretely in programming, but sometimes when people collaborate situations arise that hinder collaboration. For example, when some group members begin to talk about topics that are not related to the problem at hand. This paper proposes to use a virtual student which monitors the group's conversation and acts when "inefficient conversations" are detected.

In order to test the efficiency of the virtual student we are designing an experiment to test whether the agent correctly detects "inefficient conversations", how may times they are corrected, and most importantly, if students learn more by using the new version of HabiPro. This last aspect is the most important one since the goal of CSCL is to improve students' learning, so our main goal is not to design a perfect virtual student but for students to learn more or faster using it.

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Technology Training: HOST Model

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Abstract: Educators continue to experiment with different technology training of teachers for more effective models, turning to the internet and instructional software tools in order to create an educational environment that supports the knowledge and skill-building approaches to learning. This paper intends to share the successful technology training experience of inservice teachers and educators of preservice teachers using video instruction and Internet as delivery tools. We intend to share our resources for those who are interested in self training and those who are in charge of technology training in their staff development program

It has been almost two decades since microcomputers were introduced into public schools. Many school districts have spent millions of dollars to purchase hardware, software, and to connect classrooms with the World Wide Web. However, we continue to see misuse and under utilization of educational technology; teachers continue to struggle to master the core technical skills and are struggling in their search for effective and beneficial ways in which to use technology (Clouse & Alexander, 1997).

Educators need to get beyond perceptions that the World Wide Web is merely a communication medium for Email, for not only is it a vast global knowledge base for document distribution, it has significant and proven benefits when used as an instructional tool that reinforces effective and interactive learning. Internet technologies empower the teacher to create a global learning environment, as well as a virtual educational setting that transcends traditional boundaries. Teachers now have a treasure chest of information tools, resources and growing experience in their use with which to reinvigorate the educational process for themselves and their students.

The adoption of compressed digital video makes full interaction possible between the instructions and the learners (Garland, 1999-2000). With occasional human facilitation and reinforcement, this has created a learner-centered environment in which learning can occur at different times and in different places, as well as at different paces according to each individual's special needs (Locatis &Weisberg, 1997). We believe that specially designed instruction utilizing digital video clips and the Internet as delivery tools give learners increased control over the pace of their own learning. All too often, however, technology training emphasizes discrete skills development, ignoring application or practices that enable users to gain an understanding of the relation between the training and its use in the classroom. Therefore, the learners are discouraged to continue to increase the application their skills and knowledge gained through a particular training session. In fact, many training models fail to make the transition between the training and the classroom implementation. Traditional training has usually taken the form of providing information that may or may not be relevant to the end user

Our technology-training program utilizing the HOST Model (Holton Online Staff Training Model) was conceived with the intention of making the training highly meaningful and personalized to each individual teacher, with emphasis on the learning process and end products rather than on discrete skills.

Teachers were given multimedia instructions to help them attain a mastery of a specified set of skills directly related to the end products. The instructions were designed in a progressive way that mastery of one set of skills leads naturally to instruction of the next set of skills. The skills were organized according to their complexity moving from easy to intermediate to difficult. This is derived from the objectives for the training, the delineation of content, and the creation of activities for practice. The training model was based on the principle that everyone has the opportunity and ability to achieve a certain level of complexity, and therefore assists the teachers in building their interest in classroom implementation of technology, as well as the confidence in being able to do so. The possibility of instantaneous publishing to a worldwide audience has had an energizing effect on the teachers, resulting in greatly enhanced motivation to continue learning new skills, and thereby improving their final products.

The fact that educators do not feel that they have the necessary technological to transform the educational process is due, in part, to the ineffectiveness of past staff development activities based on outdated training models. In response to that, Holton USD 336 created a new Web site http://www.holton.k12.ks.us/training designed to help individual institutions improve their staff development activities based on what shall be referred to as the HOST model. All video instructions on this site are freeware and may be downloaded and saved to any computer. With the support of TLCF and Educate America grant funds, in the fall of 1997, a technology training model called HOST was developed by a team of educators in Holton district USD 336. In the fall of 1998, Holton USD 336 received a TLCF Professional Development Grant for nearly $50,000. Through this award, the district developed an innovative staff development web site that was used for teacher training (for 1998 staff members).

Web-based training video clips are used in the HOST model to explain various concepts and skills. Because of the multimedia capabilities of these videos, the user is able to use all their learning channels to master and apply the concepts. Users have no limit to the number of times they may want to repeat the original task they are facing, which helps them not only to better understand the nature of the task, it provides ample opportunity to achieve a deeper learning of the necessary skills to complete the task. Throughout the training, concepts are introduced slowly and they are built linearly on one another, from simple to complex. All activities have been designed to correspond to the district goals, and participants have received training matched to their own pace of learning through the training on the web. The training material is available for teachers to access from school or at home to provide continuous learning opportunities even after the initial training. The overarching goal of any HOST model training is to move participant teachers a step forward in technology implementation in their respective classrooms.

Prior to each training of the two workshops, every participant was asked to fill out a profile to self evaluate their technical skills in the areas of operating systems, word-processing, graphic editing and presentation tools. When they finished the formal training, they were asked to answer the same questions to reevaluate their knowledge and skills. Their self-evaluations were then used to measure the learning outcomes. Ninety-eight teachers participated in the first workshop, sixty-two responded to both pre- and post-evaluation questions. The pre-evaluation results showed that among those responded, the average was 48.2%, and the post-evaluation average was 72.1%, among which the highest percentage was 35 and the lowest was 0. The difference between the pre-evaluation and the post-evaluation in the first workshop was very obvious. In the second workshop, which was held during two consecutive Saturdays in March, 1999, there were 51 teachers and seven college professors participating. In this case, everyone responded to the profile questions regarding the basic knowledge and skills of utilizing Internet technology in their teaching, pre-evaluation averaged 20%, while post-evaluation averaged 82%, which shows a very significant average improvement.

The workshop finished with teachers sharing their final products with the group. It was obvious that these teachers showed great interest in creating instructional materials on the Internet and the Internet was a great place for learning and sharing. (Please checkout the following URL to see some of the projects.) Overall the workshop was a success. All the participants felt that they had gained a lot of knowledge and skills through hand-on experience. We hope that this model will contribute to the course of technology training of teachers.

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